ADDENDUM TO THE ELITE-AS OWNER'S MANUAL

NEW FEATURES / ADDITIONAL NOTES

1. NEW START-UP PROCEDURE: When starting up the Elite, it is no longer necessary to erase the computer's memory by entering GC D8 CL: Your Elite is ready to play as soon as you plug it in

2. DECIMAL/HEXADECIMAL SCORE DISPLAY: The Elite is now set up so that score is automatically shown in decimal form with the following values:

Material Score		
Pawn	=	100
Knight	=	300
Bishop	=	300
Rook	=	500
Queen	=	900

Positional Score
maximum total score = 99

Game Scores
Stalemate/Draw/Even = 0000
Checkmate = More than 9990

A dot in the score display signifies a negative score for the computer.

You may also request a display of the score and search depth after the computer has already announced its move by successively pressing the TM key before making the computer's move on the board.

The D2 square now serves the function of providing you with the score in hexadecimal form if desired. To use this option: Simply activate GC D2 CL, and all scores will be shown in hexadecimal rather than decimal.

TABLE OF CONTENTS

Section Page

1.0 Introduction....1

2.0 General Operation....2
2.1 Starting Up Your Unit....2
2.2 Putting in Modules....3
2.3 Connecting and Using the Printer....3
2.4 Moving the Pieces....5
2.5 Illegal Moves / Correcting Moves....6

3.0 Display and Operational Elements....8
3.1 Elements of the Display....8
3.1.1 The Display....8
3.1.2 The LEDs....9
3.2 Elements of Operation....9
3.2.1 Entries on Playing Squares....9
3.2.2 Control Key Entries....12
3.3 Computer Voice and Control Tone....13
3.4 The Chess Clock....13

Entering/Changing Pieces....15
4.1 Entering Pieces....15
4.1.1 Basic Set-Up....15
4.1.2 Options for Entering Pieces....15
4.2 Changing Pieces on the Board....16
4.2.1 Removing Pieces from the Board....16
4.2.2 Adding Pieces to the Board....16
4.2.3 Changing Board Positions....16
4.2.4 Changing Piece Colors....17
4.2.5 Changing Piece Types....17
4.3 Position Verification....17

A Game of Chess....18
5.1 Beginning the Game....18
5.2 Setting the Playing Direction / Choosing Colors....18
5.3 The Playing Levels....19
5.3.1 Training Levels....20
5.3.1.1 Playing Levels A1-A8....20
5.3.1.2 Playing Level B7....20
5.3.2 Tournament Levels....21
5.3.2.1 Playing Level B3 (Tournament Chess)....21
5.3.2.2 Playing Level B2 (Speed Chess)....24
5.4 Putting In Modules / Changing Modules....25
5.5 The Start of a Game / First Move....26
5.6 Thinking on the Opponent's Time....27
5.7 Move Suggestions....28
5.8 Move Take-Back....29
5.9 Changing Sides....29
5.10 Halting the Computer's Thought Process....30
5.11 Looking into the Computer's Thought Process....30

TABLE OF CONTENTS
(Continued)

Section Page

5.12 Looking at the Anticipated Line of Play....30
5.13 **Score Display**....31
5.14 **Search Depth**....32
5.15 Best Moves / Random Moves....33
5.16 Alternate Moves....33
5.17 Move Counter....34
5.18 Ending the Game....34
5.18.1 **Checkmate** / Resignation....34
5.18.2 Stalemate....35
5.18.3 Forced Draws....35
5.18.4 **Draw by Agreement**....36

6.0 **Chess Problems**....37
6.1 Analysis Level B1....37
6.2 **Mate Solving Level** B6....37
6.2.1 Setting the Search Depth....38
6.2.2 Looking into the Computer's Search Process....38
6.2.3 The Search / Announcements....38
6.2.4 **Alternate Solutions**....39

7.0 Experimental Chess....41
7.1 The Iterative Search....41
7.2 The Non-Iterative Search....42
7.3 Setting the Search Depth....42
7.4 Looking into the Computer's Search Process....43

8.0 Studying Book Openings....44
8.1 General Study of Openings....45
8.2 **Study of Specific Openings**....45
8.3 Take-Back of Opening Moves....46
8.4 Opening Move Suggestions....46
8.5 Continuation into a Game....46

9.0 Other Types of Games....47
9.1 **Monitor Mode**....47
9.2 The Computer Plays Itself....47

10.0 Additional Information....48
10.1 Positional Analysis....48
10.2 Battery Protected Memory....48

11.0 Question and Answer Section....49

12.0 Index....53

Appendix: Game Documentation Sheets
Quick Reference Sheet - Board Displays
Quick Reference Sheet - Functions of the Squares

2.0 GENERAL OPERATION

2.1 STARTING UP YOUR UNIT

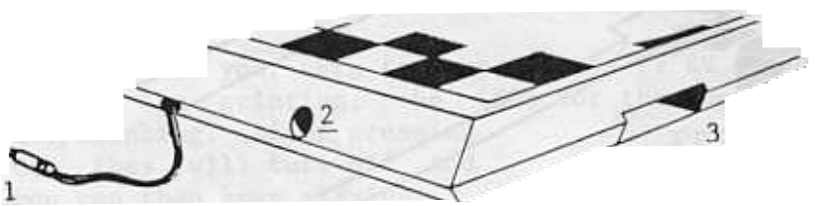
The unit can only be operated on house current. Plug the enclosed transformer into the chess computer and into your wall outlet. The transformer (120V) was developed especially for this unit, and has been built for continuous operation. If it should get warm during use, this is normal and can be disregarded.

Please use only the transformer which has been provided. Using any other transformer could adversely affect the operation of the computer and could possibly even damage the unit.

The unit is started up as follows:

1. Place all chess pieces in their starting positions in the centers of the squares
2. Connect the transformer
3. Erase the memory by entering GAME CONTROL D8 CL

If the unit is ready to play, you will be greeted with "I am Fidelitv's Chess Challenger, your computer opponent."



1 Transformer line cord
2 Printer cable plug
3 Module receptacle

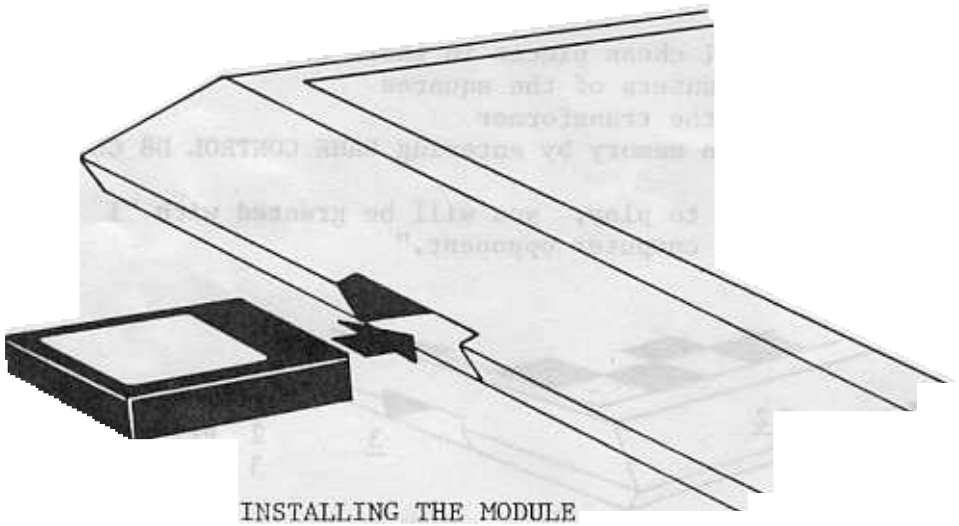
If your unit does not show GS:0 or 0:00 when you plug it in, follow this procedure:

1. Unplug the power connector and wait a few seconds.
2. While pressing down on the GAME CONTROL Key, plug in the power connector.

2.2 PUTTING IN MODULES

Your chess computer has been designed so that its program can be expanded and improved by the use of interchangeable modules. Before putting a module in (or changing modules), it is imperative that you unplug your game from the power cord. After inserting the module, replug your game into the power cord and resume play. Your current game board position will not be lost, since it was stored in the unit's battery protected memory. When the Elite A/S is switched off, its memory still retains the information and instructions which it has been given. If, for any reason, the power is switched off in the middle of a game, certain features of that game will be recorded, making possible an eventual resumption of play.

For more information regarding the specific times when modules should be changed, see Section 5.4.



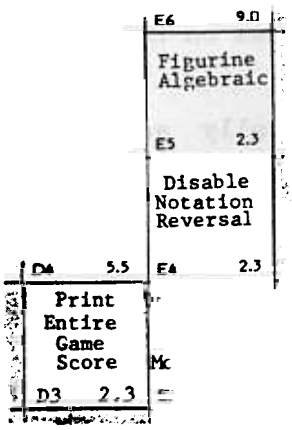
INSTALLING THE MODULE

2.3 CONNECTING AND USING THE PRINTER

The thermal printer shown here is available as an accessory for your chess computer. The printer comes with its own transformer.

It not only prints the numbered moves in algebraic notation, but will also give you a graphic printout of the playing board on command. The additional capability of printing the selected level of play has been added with the Elite A/S. Any change in level selection will also be printed.

When using a printer, you can spare yourself the often troublesome and distracting task of having to write down the moves. This is a simple way to keep a record of all your games and analyses.



You may choose to have the printer record your game move for move while you are playing, or you can wait until the end of the game and then print the entire game score. You may also, of course, use the Print Entire Game Score feature to make extra copies for your records. To use this feature, simply unplug the printer cable plug at the computer. When you have finished the game (or earlier if you wish), reinsert the printer cable plug and activate GAME CONTROL D3 CL. For multiple copies, reactivate GAME CONTROL D3 CL.

You can choose from two different methods of printing:

a. **Algebraic notation:** The game moves will be printed out automatically in the simplest form. The squares are referred to without piece symbols.

b. **Figurine algebraic:** This modern notation can also be used, by entering GAME CONTROL E5 CL. Ordinarily, only the TO square of the move plus the symbol of the moving piece is printed.

If you are playing with the black pieces, you must also activate E4 along with GAME CONTROL D1 CL (see Section 5.2). Without the E4 entry, the moves will be printed in reverse notation.

When it is your turn to move, press PV RV CL to get the board printout. During the printing, the LEDs for the Queen positions will be steadily lit/blinking. After pressing CL, they will turn off and you can then keep playing.

The computer always prints the move and countermove after the black move has been made on the board. The computer will not accept any moves or commands while the printer is printing.

For operation of the printer, you must strictly follow the instruction book which accompanies it.

NOTE: Before starting each new game, you must push the printer's ON/OFF switch to erase its memory. The printer will signal that it is ready by printing "READY". At this point, you should activate D8, D7 or D6.

```
   READY                    READY

   CHESS                    CHESS
 CHALLENGER               CHALLENGER

01 E2E4  E7E5            01 E4    E5
02 D2D4  E5D4            02 D4    ED4
03 C2C3  D4C3            03 C3    DC3
04 F1C4  C3B2            04 ♗C4   CB2
05 C1B2  D7D5            05 ♗B2   D5
06 C4D5  F8B4            06 ♗D5   ♞B4
07 B1C3  B4C3            07 ♘C3   ♞C3
08 B2C3  G8F6            08 ♗C3   ♘F6
09 D1F3  F6D5            09 ♕F3   ♘D5
10 A1D1  C8D7            10 ♖D1   ♞D7
11 D1D5  ...             11 ♖D5   ...
```

Above: Algebraic Notation

```
   A B C D E F G H
8  ♜ ♞ ♗ - ♝ ♝ - - ♜  8
7  ♟ ♟ ♟ ♟ ♛ - ♟ ♟ ♟  7
6  - - - - - - - - -  6
5  - - - ♙ - - - - -  5
4  - - - - ♘ - - - -  4
3  - - ♗ - - ♕ - - -  3
2  ♙ ♙ ♙ ♙ - ♙ ♙ ♙ ♙  2
1  ♖ ♘ ♗ - ♔ - ♘ ♖ -  1
   A B C D E F G H

11          0-0
```

Right: Figurine Algebraic Notation

2.4 MOVING THE PIECES

The chess pieces are moved the same way as on a normal chess board. The moves are entered simultaneously with the moving of the pieces on the surface of the board.

The computer registers the moves of the pieces via magnetically activated contacts which are built into the squares. These contacts are activated by magnets built into the bases of the chess pieces. The computer does not have to be told the type of piece which is being moved, since it knows this from the position of the piece.

Technical Aspects of Piece Movement

You make moves by **picking up** the piece to be moved, and then **putting it down** on the square to which you want to move it.

When you pick the piece up, you relay to the computer the color and type of the piece; when you put it back down, you relay to the computer the square to which you are moving the piece.

Avoid sliding the chess pieces across the squares, since it could happen that a square you did not intend to move to could be activated.

General Movement of Pieces

When making your move, after you have picked up the chess piece, the LED in the FROM square will stay lit until you put the piece down on the TO square. When you put the piece down, the TO square will light briefly. Your move has now been entered.

The computer displays its moves by steadily lighting the LED of the FROM square and flashing the LED in the TO square. After you have made its move, the LED will go out.

As an additional confirmation of or accompaniment to the move, there are announcements (computer voice) and/or control tones. See Section 3.3 (computer voice and control tone).

Captures

When capturing (except En Passant captures), you must first take the tured piece off the board, and then make your actual move on the board.

En Passant

When making an En Passant capture, you must first move your piece to the capturing move, and then take the captured pawn off the board.

Castling

In accordance with the rules of chess, you must first move the King and then move the Rook.

If you want to castle, move your King and the computer will then light the LEDs for the Rook's move.

The computer castles by first lighting the LEDs for the King's move. When you have moved its King, the LEDs will light to indicate the Rook move.

If you should want to castle and you inadvertently move the Rook first, the computer will not realize that you wanted to castle and will accept this as a Rook move. You can correct your mistake by means of the Take Back feature (see Section 5.8).

Pawn Promotions

When a pawn reaches the eighth rank, as a part of that same move that pawn must be promoted to a Queen, a Rook, a Bishop, or a Knight of the same color. The player can decide the piece to which he wants to promote. Once that pawn is promoted, it immediately takes on the power of the piece to which it was promoted.

When one of your pawns reaches the eighth rank, the LED on that square will flash until you identify your promotion selection by pressing one of the piece symbol keys. Before you press the piece symbol key, you must first remove the pawn from the board and replace it with the selected piece. The LED for the pawn symbol key will light to request the promotion, and once you have pressed the appropriate piece symbol key, the LED will go out.

If one of the computer's pawns reaches the eighth rank, the computer will evaluate its present position and will promote its pawn to the piece it feels will be of most value. You must make the promotion by first moving the computer's pawn to the TO square, and then taking the pawn off the board. The LED on that square will remain on until the promotion is complete. The piece symbol key will identify the piece the computer has chosen, and putting that piece on the square will complete the procedure. To take back a move, please see Section 5.8.

NOTE: Chess pieces should always be placed in the middle of the squares.

2.5 ILLEGAL MOVES / CORRECTING MOVES

You also have the opportunity, of course, of taking back or correcting moves that were made by mistake, both legal or illegal moves.

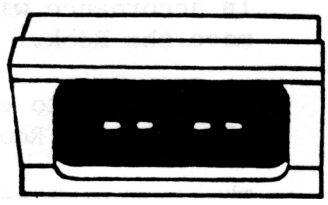
Legal Moves Made by Mistake

If you unintentionally make a legal move that you did not want to make, you must first wait for the computer to move and make its move on the board. If the computer has not finished thinking about its move, simply interrupt its

thinking process by pressing the RV Key. You can then take both the computer's move and your move back, as described in Section 5.8.

Illegal Moves

The computer will only allow moves that are in compliance with the rules of chess. Illegal moves are not accepted. An illegal move is indicated by four dashes which appear in the display window, and the LEDs on the squares of the illegal move will stay on. The voice will repeatedly announce "Illegal Move". To correct the illegal move, simply put the piece back on its original FROM square.



ILLEGAL MOVE

3.0 DISPLAY AND OPERATIONAL ELEMENTS

3.1 ELEMENTS OF THE DISPLAY

3.1.1 THE DISPLAY

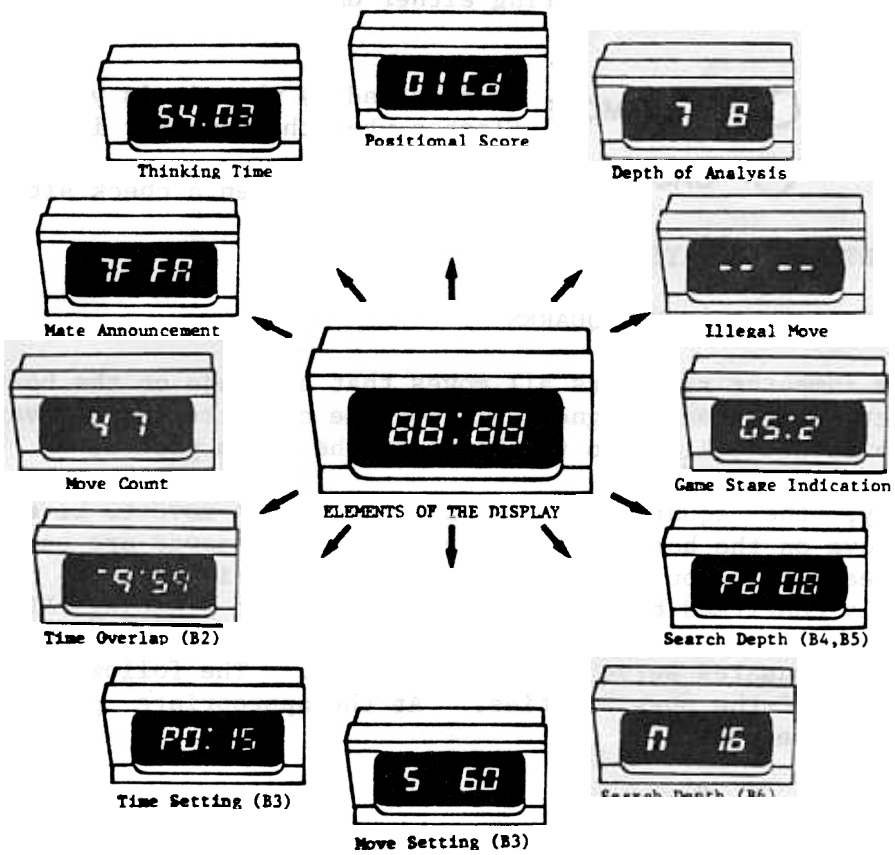
The display has many extensive and varied functions. It supplements and improves the computer's communication abilities. It confirms each step you take, and it simplifies the operation of the unit.

Information is displayed via a combination of five LED units. Everything that is not directly related to the actual moves of the game is displayed. in algebraic and symbolic forms.

The display shows you the depth of search and positional score, the amount of time that has been used and how much time you have left. It tells you when you have taken too much time or have made an illegal move, it displays mates, and it recommends when you should change modules. The entry of time control values, time handicaps, and depth of search are confirmed.

The display comes on automatically. However, you can essentially decide what you want the display to show. The different possibilities are covered in the appropriate sections of this manual.

SUMMARY OF THE DISPLAY POSSIBILITIES



3.1.2. THE LEDS (Light Emitting Diodes)

This section, along with Section 3.2 (Elements of Operation), will give you the information that you need in order to play chess against the computer. Each entry is confirmed by the computer by steadily lit or flashing LEDs (located in the corner of each square).

Besides showing you the actual moves on the board, combinations of steadily lit or flashing LEDs give you other information, mainly towards the end of a game. Examples of this would be mate announcements, draw announcements, going beyond the time limits, etc. For more details, see Section 5.18.

Position verification is accomplished by means of steadily lit or flashing LEDs which indicate both colors (see Section 4.3). Other uses are fully described in the appropriate sections of this manual.

When a move is being made, the LEDs next to the piece symbol keys will show the color and type of piece being moved. When a check situation occurs, the "CHECK" LED lights. The "YOUR MOVE" LED is on steadily when it is your turn to move. When the "YOUR MOVE" LED is flashing, you know that the computer is thinking.

After entering GAME CONTROL D8 CL, you can check to see that all LEDs are working by activating square A1. At this point all the LEDs on the playing board and all control key LEDs will be on steadily. After doing this, you must end the procedure by entering either GAME CONTROL D8 CL or GAME CONTROL D6 CL.

○ **YOUR MOVE**	Is on steadily when it is your turn to move Flashes when the computer is thinking
○ **CHECK**	Is on steadily when a check situation occurs

3.2 ELEMENTS OF OPERATION

3.2.1 ENTRIES ON PLAYING SQUARES

The chess computer registers all moves that are made on the board by means of contacts which react magnetically. The contacts are activated by the magnets which are built into the bases of the chess pieces.

Essentially, the square contacts will cause each move to be entered as you make the move on the board. **Technically,** these moves are entered into the computer each time you **pick a piece up** or **put a piece down.** Move entries are visually confirmed by means of steadily lit or flashing LEDs.

Many of the squares serve a double function. The following summary will show you all of the possibilities. At the appropriate places, they are described in great detail.

The other methods of entry can be divided into three general categories:

a. Playing Levels and Special Levels

The playing and special levels are found in the A and B files. Only one of these levels can be chosen at any particular time. You must press LV to be able to select your level, and press CL to enter the level you have chosen.

b. Basic and Additional Options

The basic options are found on the D squares, and the additional options are divided between the D and E squares. Several entries can be made at one time. You must press GAME CONTROL to get into this mode, and enter the options you have chosen by pressing CL.

Computer Voice and Control Tone

The computer voice and control tone options are found in the squares of the G and H files. You can choose one or more of the options, as you wish (see Section 3.3). To get into this mode, you must press the sound control key, and to get out of it, press CL.

Technically, these entries are made similarly to the manner in which moves are entered. In order to enter an option, you must use a chess piece to activate the magnet on the desired square. The computer will confirm your entries by lighting the LEDs on the squares you have activated.

You can also, of course, cancel the options. To do so, simply activate the square until its LED is turns off.

You must always press CL after entering options, at which point all LEDs will go out. You are then ready to play.

You can go back and review the options you have chosen by pressing the GAME CONTROL Key. The LEDs for those squares you have activated will be on. The LEDs on squares D8, D7 and D6, however, will not be on when you are simply reviewing the options.

SUMMARY - FUNCTIONS OF THE SQUARES

PLAYING LEVELS
SPECIAL LEVELS

Begin Entry: ◉ LV
Display: -LC-
End Entry: ◉ CL

BASIC OPTIONS
ADDITIONAL OPTIONS

Begin Entry: ◉ GAME CONTROL
Display: -GC-
End Entry: ◉ CL

CONTROL TONE
COMPUTER VOICE

Begin Entry: ◉ 🔇
Display: -SC-
End Entry: ◉ CL

Level A8 Average Response 6 min. A8 5.3.1	B8	C8	START Memory Erased New Game 2.1 D8 5.1	Inter-mediate Level E8 5.6	F8	Computer Voice On G8	Computer Voice Off H8
Level A7 Average Response 3 m/45 s A7 5.3.1	Level B7 Fixed Time for each Move B7 5.3.1	C7	Clear Board D7 4.1	Book Practice Mode E7 8.0	F7	Computer Voice Unlimited G7	Computer Voice Limited H7
Level A6 Average Response 3 min. A6 5.3.1	Mate Solving Level B6 6.2	C6	New Game with Previous Options D6 5.1	Monitor Mode E6 9.0	F6	Computer Voice High G6	Computer Voice Low H6
Level A5 Average Response 2 min. A5 5.3.1	Non-Iterative Search B5 7.2	C5	Change Color With Move 4.1.2 D5 5.5	Figurine Algebraic E5 2.3	F5	G5	H5
Level A4 Average Response 1 min. A4 5.3.1	Iterative Search B4 7.1	C4	Cancel Opening Book D4 5.5	Disable Notation Reversal E4 2.3	F4	Control Tone On G4	Control Tone Off H4
Level A3 Average Response 30 sec. A3 5.3.1	Tournament Chess Level B3 5.3.2	C3	Print Entire Game Score D3 2.3	Display of Depth, Score, Move Times E3 5.13	F3	Control Tone Unlimited G3	Control Tone Limited H3
Level A2 Average Response 15 sec. A2 5.3.1	Blitz/ Lightning Chess Level B2 5.3.2	C2	D2	Resign Enable E2 5.18	F2	G2	H2
Level A1 Average Response 5 sec. A1 5.3.1	Analysis Level B1 6.1	C1	Changing the Playing Direction D1 5.2	Automatic Search Depth Display E1 5.14	F1	G1	H1

3.2.2 CONTROL KEY ENTRIES

The 11 control keys on the side of the board have other possible and necessary functions. Some of these keys have multiple functions. The following summary will show you all of the possibilities. Detailed descriptions can be found at the appropriate places in this manual.

Entries via these control keys are made by pushing lightly on the keys. Your entries are confirmed in various ways: by the computer voice, by control tones, or by LEDs that come on.

SUMMARY OF THE KEY FUNCTIONS

Symbol — Function (Section Reference)

GAME CONTROL — To enter "Basic and Additional Options" (Summary, 3.2.1)

To enter "Computer Voice and Control Tone" (3.3)

PB Problem Mode (4.1, 4.2)

PV Position Verification (4.3)

Time Controls 3.4 / Positional Score(5.13) / Depth of Search(5.14)

ST Time Controls
Level Setting

TB Move Take-Back (Summary, 3.2.1) / Level Setting (Levels B2 to B7)

LV Playing Levels (Summary, 3.2.1) / Depth of Search (5.14) /
Level Setting (Levels B2 to B7)

Suggested Moves (5.7) / Move Count (5.17) / Showing Move
Computer is Thinking About (5.11) / Principal Variation (5.12)

Entering Options / Turning Off LEDs

RV Computer Makes First Move (5.5) / Changing Sides (5.9) /
Halting Thinking Process (5.10) / Alternate Moves (5.16)

King
Queen
Rook
Bishop
Knight
Pawn

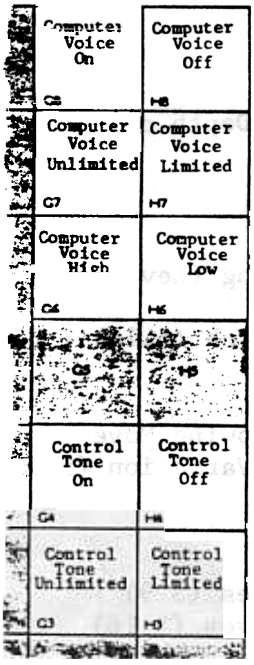
Problem Mode (4.1, 4.2)
Position Verification (4.3)
Pawn Promotions (2.4)

COMPUTER VOICE AND CONTROL TONE

You have the choice of turning on either the computer voice or the control tone. You can also, of course, use both of them together or turn both of them off.

The computer voice will confirm all of the moves that you make, and will announce all of the computer's moves. It tells you the type of move made (capture, castle, pawn promotion, etc.), and the pieces that are part of that move. It tells you when an illegal move has been made, when a check situation occurs, and among other things, says "Mate" or "Stalemate" at the end of the game. The voice volume can be set low or high, and you can limit the announcements to only "Illegal Move," "Check" and "Mate".

With the control tone, the computer will confirm all moves made on the board and all keystrokes. If you wish, you can set it so that the tone only accompanies the moves.



When you first start up the computer, the voice is automatically set on high with the full vocabulary, and the control tone is off.

The voice and tone options are entered by pressing the sound control key and activating various squares. You must always press CL after you have chosen your options.

SUMMARY

G8 Computer voice on
H8 Computer voice off
G7 Full vocabulary
H7 Limited vocabulary
G6 Voice high
H6 Voice low
G4 Control tone on
H4 Control tone off
G3 Full tone
H3 Limited tone

If you are playing with the black pieces, as described in Section 5.2, you must also activate square E4 (Disable Notation Reversal) if you are using the computer voice. If you do not activate E4, the moves will be announced in reverse notation.

THE CHESS CLOCK

The four-function integral clock starts running automatically after the first move is made on the board. The clock will stop after each player makes his move; at that point, it will start up again for the player who is to move next.

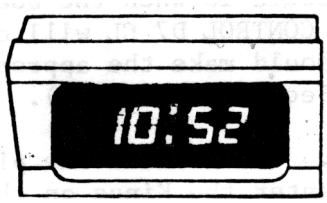
On all levels except B2, the clock will count the time it takes for each individual move and add this to the total thinking time. In Level B2, however, the time taken for each move is subtracted from the total time allowed for that player to play the game. For blitz or speed chess games played on Level B2, the chess clock changes to a split screen format. This allows the remaining time for both players to be shown in the display at the same time. For a detailed description of the chess clock when used with Level B2, see Section 5.3.2.2.

The time is displayed in minutes and seconds; times over an hour are shown in hours and minutes. To distinguish between the two displays, a dash will appear in the upper left-hand corner of the display when it is showing hours and minutes.

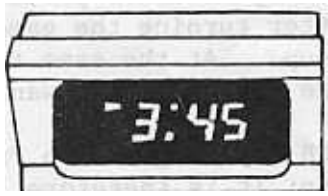
The four different times can be seen at any time by pressing the TM and ST Keys.

When a player is thinking about his move, the time being taken for that move is automatically displayed. By pressing and holding the TM Key, the total thinking time for that player is displayed.

By pressing TM ST, you can determine how much time the player who is not moving took to make his last move. Pressing and holding TM at that point will show you his total thinking time. To switch the clock back to the person who is thinking about his move, press the ST Key.



Minutes : Seconds



Hours : Minutes

The colon in the center of the display window indicates which player's clock is being displayed. The bottom colon indicates the human's clock, and the top colon indicates the computer's clock.

Human's Clock

Computer's Clock

If you should desire to interrupt or delay the progress of a game and not have the clocks continue to run, you may do so by simply not acknowledging the computer's move until you are ready to continue play. Both clocks will stop the instant the computer indicates its move, and the clocks will only resume after you have physically made the computer's move on the board.

ENTERING/CHANGING PIECES

ENTERING PIECES

4.1.1 BASIC SET-UP

After starting up your game, or after activating D8 or D6, the board is set up automatically (see Section 5.1). The white chess pieces are on the bottom two rows (human plays white), and the black pieces are on the top two rows (computer plays black).

By then pressing GAME CONTROL D1 CL, the computer will reverse the board set-up, putting black at the bottom of the board. The pieces should be placed on the board in accordance with the set-up you have chosen.

The board can be cleared of all pieces by pressing GAME CONTROL D7 CL (Clear Board).

4.1.2 OPTIONS FOR ENTERING PIECES

You can enter pieces on the board in one of three different ways:

a. Entering pieces on a clear board
b. Adding pieces to a certain board position
c. Entering pieces via the Monitor Mode

The easiest way to enter pieces onto the board is when the board is already clear. After turning the game on, GAME CONTROL D7 CL will clear the basic board set-up. At the same time, you should make the appropriate settings for the side and color you want to play (Sections 5.2, 5.5).

Press the PB Key to get into Problem Mode. PB is also the piece symbol key for the King; it is therefore logical to enter the Kings on the board first. Normally, you should enter all chess pieces of the same type one after the other. To do this, simply press the appropriate piece symbol key first and then enter all pieces of that type on the board.

White chess pieces are placed on the board by simply putting them down on the desired squares; black pieces should be placed on the board, picked up briefly, and then put back down on the board. The computer acknowledges that a white piece has been entered on a square by lighting that square's LED steadily. When a black piece occupies a square, the LED will flash.

Mistaken entries are corrected by simply picking up the chess piece and removing it from the board. The LED on that square will go out to signify that the square is now empty.

You can then press the piece symbol key for the next piece type you want to put on the board. After placing all of the desired pieces on the board, press CL to enter the positions into the computer. Use Position Verification to verify that you have placed all of the desired pieces in the right places (see Section 4.3).

You can, of course, also add pieces to the board when a position is already set up. After pressing PB, the LEDs for all occupied squares will be on. Enter all desired pieces as described above, and then press CL to get out of Problem Mode.

If you want to set up a board position stemming from a certain opening, you can accomplish this very easily by using the Monitor Mode (see Section 9.0). Simply set up the board with the pieces in their **basic positions**, and then press GAME CONTROL E6 CL to get into Monitor Mode. At this point, you can make alternating legal moves for both colors until you have reached the desired board position. You should then press GAME CONTROL E6 CL to get out of Monitor Mode (the LED in square E6 should go out). The color to move will depend upon the last move that was made on the board. Pressing GAME CONTROL D5 CL will change the color to move, if necessary.

> NOTE: Before entering GAME CONTROL D7 CL, and before you enter any pieces on the board, you **must** erase the game's memory by entering GAME CONTROL D8 CL. This is also necessary after first plugging the game in.

CHANGING PIECES ON THE BOARD

At any time during the game, when it is your turn to move, you can change any of the pieces on the board. You can add pieces and/or remove pieces. After you make changes on the board, you should always use Position Verification to make sure of the board positions (see Section 4.3).

4.2.1 REMOVING PIECES FROM THE BOARD

If you want to remove a chess piece from the board, simply press the PB Key and take the desired piece(s) off the board. Press CL to get out of Problem Mode.

2 ADDING PIECES TO THE BOARD

If you wish to add chess pieces to the board during a game, you must press the PB Key and then the appropriate piece symbol key. To add a white piece of that type, simply put the piece down on the square. To add a black piece, you must put the piece down, pick it up, and then put it back down on the square once more.

You know that white pieces have been entered when the LEDs on those squares are steadily on. For black pieces, the LEDs will be flashing. Press CL to get out of Problem Mode.

4.2.3 CHANGING BOARD POSITIONS

If you would like to change the board position of any piece on the board, press the PB Key and then the appropriate piece symbol key. Now move the piece to the desired new square and change the color if necessary, as described above. Press CL to get out of Problem Mode.

CHANGING PIECE COLORS

When you want to change the color of a piece on the board, first press the PB Key and then the appropriate piece symbol key. Simply pick the desired piece up and put it back down on the same square, and the color will be changed. Press CL to get out of Problem Mode.

4.2.5 CHANGING PIECE TYPES

If you wish to change a piece on the board to a different piece type, press the PB Key and then the piece symbol key for the new piece type. Now exchange the pieces and set the color as described above if necessary. Press CL to get out of Problem Mode.

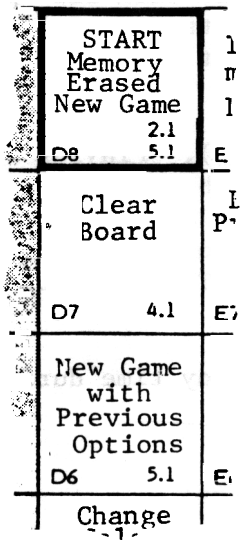
POSITION VERIFICATION

After entering pieces, changing pieces, or taking back moves, you should always use Position Verification to make sure that you have set up the board correctly. To do this, press the PV Key and then press each individual piece symbol key. The computer will show you which squares are occupied by lighting the LEDs in those squares. The LEDs will be steadily on for all white pieces, and will be flashing for all black pieces. Press CL to get out of Position Verification.

A GAME OF CHESS

5.1 BEGINNING THE GAME

At the beginning of a new game, you must enter GAME CONTROL D8 CL. In doing this, you are erasing all previous entries or options that you may have chosen. You must do this even if you have just plugged the unit in (see Section 2.1) After plugging the game in, or after activating D8, the pieces are all in their basic starting positions (white on the bottom two rows), Level One is in effect (average response time 5 seconds), the color is automatically set (the computer is playing black), the voice is selected, and the computer is set to think on your time. If you wish to change any of the options, you may do so at this time.



If, however, you want to play a game of chess with the same options you had set for the previous game you played, you may enter GAME CONTROL D6 CL instead. All of the options you have previously chosen (color, playing levels, etc.) will remain the same and do not have to be re-entered.

Before entering either D8 or D6, please put all pieces on their starting squares.

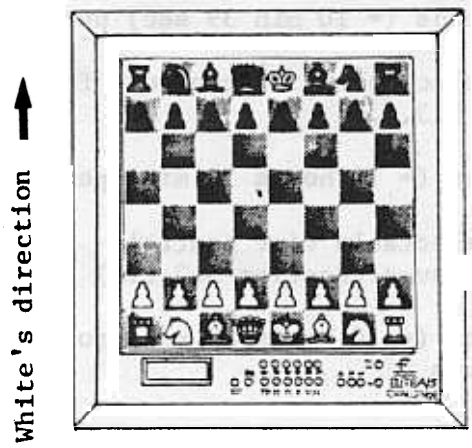
NOTE: After plugging the unit in, and before starting a new game, setting up a problem, or entering any options, you must always enter GAME CONTROL D8 CL.

SETTING THE PLAYING DIRECTION / CHOOSING COLORS

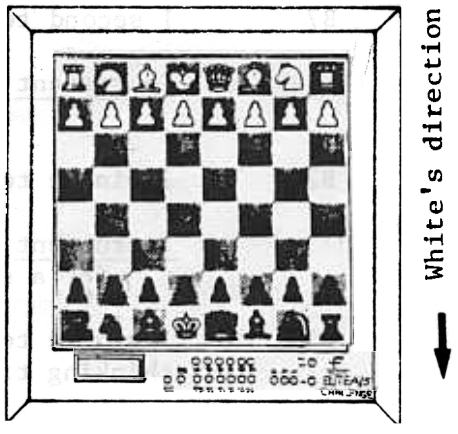
The unit is automatically set for the white pieces to move from the bottom to the top and for the white pieces to occupy the bottom two rows.

If you would rather play with the black pieces from the bottom of the board, enter GAME CONTROL D1 CL. Be sure to set your pieces up on the board before turning the unit on or after entering GAME CONTROL, but before choosing any options.

The direction of play is the only option that cannot be changed once you have started a game.



Direction of play without D1 option



Direction of play with D1 option

5.3 THE PLAYING LEVELS

The playing strength of a chess program primarily depends upon the amount of time available for thinking: the longer the thinking time, the higher the playing strength.

The program offers you an infinite number of playing levels with all possible options with regard to choosing and setting time limits for individual moves or for a number of moves. This enables you to set up any desired playing strength.

After starting up the game or after entering D8 (new game), Playing Level One is automatically in effect. **The playing level is set** by pressing the LV Key (the display will show -LC-), and you must then use a chess piece to activate the contact in the desired option square. The program will confirm your option choice by lighting the LED in that square. This procedure is ended by pressing CL.

The playing level can be changed as often as you wish at any time during the game.

Summary of the Playing Levels

Training levels with pre-programmed settings (Section 5.3.1.1)

Playing Level	Time Controls (Settings)	Average Response Time
A1	60 moves / 5 minutes (Blitz Chess)	5 seconds
A2	60 moves / 15 minutes (Lightning Chess)	15 seconds
A3	60 moves / 30 minutes (Lightning Chess)	30 seconds
A4	60 moves / 1 hour	1 minute
A5	30 moves / 1 hour	2 minutes
A6	40 moves / 2 hours (Tournament Chess)	3 minutes
A7	40 moves / 2 hours 30 min (Tournament Chess)	3 minutes 45 sec
A8	30 moves / 3 hours	6 minutes

Training level with user selectable time controls for individual moves (Section 5.3.1.2)

B7	1 second to 9 minutes 99 seconds (= 10 min 39 sec per move

Tournament level with user selectable time controls for a game (Section 5.3.2.2)

B2	1 minute to 9 hours 99 minutes (= 10 hours 39 min) per game

Tournament level with user selectable time controls for a specific number of moves (Section 5.3.2.1)

B3	1 minute to 9 hours 99 minutes (= 10 hours 39 min) total thinking time for 1 to 99 moves

5.3.1 TRAINING LEVELS

5.3.1.1 PLAYING LEVELS A1-A8

For playing levels A1 through A8, the total thinking time is pre-set for a certain number of moves. These thinking times are pre-programmed and you cannot change these levels.

Since these are training levels, the total thinking time for a certain number of moves for the player and/or for the computer are not strictly adhered to. The time limits should serve as a guide. As a rule, the computer will hold itself to those times and will usually not use up all of the time which it has available.

The average response time for each individual move can be computed from the time limits. Depending on the complexity and the nature of the position, the actual thinking time can deviate considerably from the average time. For example, the computer will use very little time when its King is in check and it only has one legal move. On the other hand, the computer might use more time when it is on the defensive or when the program sees a possible mate and wants to make the best move.

When time is saved on a move, the thinking time which has not been used is distributed equally among the rest of the moves; when more time is taken for a move, the excess time taken is subtracted from the average times taken for the rest of the moves. The thinking time is then recalculated for each move that follows.

Functions such as move take-backs and changing sides have no effect on the time limits.

The settings for playing levels A1-A8 can be found in the summary in Section 5.3.

Intermediate Levels

Each of the above mentioned playing levels A1-A8 can be weakened by turning off the computer's "brain" (see Section 5.6). Essentially, by doing this you are not allowing the computer to think on your time. This enables you to have 8 more intermediate levels from which to choose.

You can turn off the "brain" by entering GAME CONTROL E8 CL. You turn it off and on again as often as you wish during a game.

5.3.1.2 PLAYING LEVEL B7 (Training Level)

In level B7, another training level, you no longer set the total thinking time for a certain number of moves, but rather the thinking time for the individual move. The time that you set will be in effect for all moves which follow.

In contrast to the other training levels, the program can no longer divide up the thinking times for the individual moves. After the time limit has been reached, the computer is forced to halt its thinking process and will play the best move it has found at that point. Occasionally, when faced with forced moves, the computer will not use all of its allotted time and will sometimes even respond immediately.

B7 - Entry Outline

Entry	Display	Function/Note
LV	-LC-	Start of entry.
B7	L0:05	Choice of playing level and preparation for entry
ST	L0:00	Entry of hours minutes
TB	↓ ↓↓	Entry of minutes (ten column) seconds
LV	L9:99	Entry of minutes (one column)
CL	0:00	End of entry

Zero entries are not allowed

NOTE: When using the above outline to enter information, the chess piece which you are using to activate the square contacts cannot be put back down on the entry square (in this case B7) during the entire entry procedure! Please hold the chess piece in your hand while you are doing this.

5.3.2 TOURNAMENT LEVELS

5.3.2.1 PLAYING LEVEL B3 (Tournament Chess)

As an extension of and supplement to the training levels, level B3 is provided as a level for serious tournament chess. Each player must make a certain number of moves within a set time period, in accordance with tournament rules. These two factors - number of moves and time controls - must be set in advance.

In today's tournament chess, several different time controls with varied numbers of moves are customary for a game. For example:

Event	First Time Control	Second Time Control	Third Time Control
International	40 moves/2.5 hours	16 moves/1 hour	
National	50 moves/2.5 hours	20 moves/1 hour	see below
Regional	40 moves/2 hours	20 moves/1 hour	

After the second time control, three different procedures are generally used in order to determine the outcome of a game:

a. More time controls are added; in this case the values of the second time control are usually used for all the rest of the moves.

b. A total amount of thinking time is set for all the remaining moves, without taking into consideration the number of possible moves which will be made.

c. The game will be evaluated by a neutral party.

You can set the computer for the third time control as in a. or b. above.

Generally, after the thinking time has run out, there will be a check to see if the set number of moves were made. If this is not the case, the game will be forfeited because it went beyond the time limits.

The computer takes its allotted thinking time and divides it up as desired. The actual thinking times will vary considerably from the average response times. Depending upon the complexity and nature of the position, the computer will take more or less time for each move.

If the computer takes less of the allotted time for a move, the saved time will be divided equally among the rest of the moves; if the computer takes more time for a move, that amount of time will be subtracted from the rest of the moves to correct the time controls. The thinking times will be calculated after each following move.

Example of taking less than the allotted time:

Imagine that the computer has been set to make 40 moves in 2 hours, and it makes the first 20 moves out of its opening library. Since the amount of time taken to think about these first 20 moves was zero, the computer still has the entire amount of thinking time left. As noted above, the saved time will be equally divided among the rest of the moves. From that point on, the average response time will then be 6 minutes per move for the other 20 moves.

NOTE: When using the following outline to enter information, the chess piece which you are using to activate the square contacts cannot be put back down on the entry square (in this case B3) during the entire entry procedure! Please hold the chess piece in your hand while you are doing this.

B3 - Entry Outline

Entry	Display	Function/Note
LV	-LC-	Start of entry
B3	P0:05	Choice of playing level and preparation for entry of thinking time for first time control
ST	P0:00	Entry of hours
TB	↓ ↓↓	Entry of minutes (ten column)
LV	P9:99	Entry of minutes (one column)
B3	P 60	Preparation for entry of move numbers for first time control
TB	P 00	Entry of moves (ten column)
	↓↓	
LV	P 99	Entry of moves (one column)
B3	S0:05	Preparation for entry of thinking time for second time control
ST	S0:00	Entry of hours
TB	↓ ↓↓	Entry of minutes (ten column)
LV	S9:99	Entry of minutes (one column)
B3	S 60	Preparation for entry of move numbers for second time control
TB	S 00	Entry of moves (ten column)
	↓↓	
LV	S 99	Entry of moves (one column)
B3	T0:00	Preparation for entry of a third time control

Option A: If a zero is entered, all values for the second time control will be carried over for the third time control and all others.

---	T0:00	
CL	0:00	End of entry

Option B: By using the following entry, all moves still to be made will be made within the pre-set time limit, regardless of how many moves are made. The first player to go beyond the time limit will lose the game.

ST	T0:	Entry of hours
TB	↓	Entry of minutes (ten column)
LV	T9:	Entry of minutes (one column)
CL	0:	End of entry

Please note that zero entries cannot be made for the first and second time controls.

5.3.2.2 PLAYING LEVEL B2 (Blitz or Speed Chess)

Playing level B2 provides you with another tournament level. On this level, a total time limit is set for the game, without taking into consideration the number of moves which will be made. This type of setting is mainly used for blitz or speed chess games. In tournament chess today, the following time limits are customary:

Blitz Chess: 5-10 minutes per game
Speed Chess: 20-45 minutes per game

The time settings must be entered individually for each side. This gives you the opportunity to enter different times for yourself and the computer. The game has to end within the set time limit. If one of the players should go beyond his total thinking time, that player loses the game.

If the computer goes beyond its time, it will concede defeat by displaying 00 in the left-hand side of the display and flashing the LEDs in rows 2, 4, 6, and 8 (see diagram).

If the human goes beyond his time, the computer will recognize this and display 00 as the two digits on the right, with the LEDs in rows 2, 4, 6, and 8 steadily lit (see diagram).

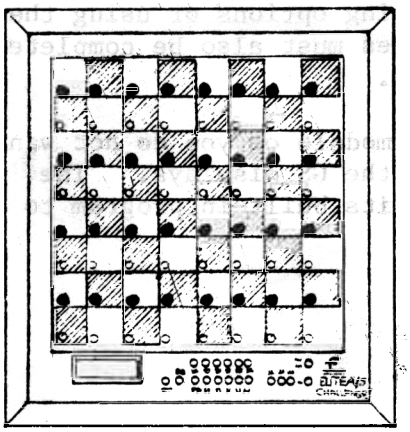
B2 - Entry Outline

Entry	Display	Function/Note
LV	-LC-	Start of entry
B2	H0:05	Choice of playing level and preparation for entry of total time for the player (H=Human)
ST	H0:00	Entry of hours
TB	↓ ↓↓	Entry of minutes (ten column)
LV	H9:99	Entry of minutes (one column)
B2	C0:00	Preparation for entry of total time for the computer (C=Computer)
ST	C0:00	Entry of hours
TB	↓ ↓↓	Entry of minutes (ten column)
LV	C9:99	Entry of minutes (one column)
CL	0:00	End of entry

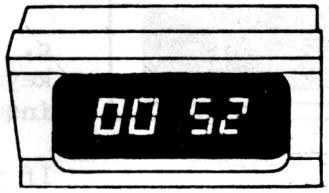
Zero entries are not allowed.

NOTE: When using the above outline to enter information, the chess piece which you are using to activate the square contacts cannot be put back down on the entry square (in this case B2) or any other A or B square during the entire entry procedure. Please hold the chess piece in your hand during this procedure.

As each move is made on the board, the clock will automatically display the amount of time remaining for each player. The left-hand digits show the time remaining for the computer, and the right-hand digits show the time remaining for the human. If the time remaining is one hour or greater, the digit display will show hours. If the time remaining is less than one hour, the digit display will show the number of minutes remaining. If only seconds remain, the digits will show the number of seconds. The display will show the time remaining in the game in a count down mode, i.e., the clock will run in reverse.



Time limit has been exceeded



If either side goes beyond the set time limits, the game is normally ended at that point.

However, if you would like to continue the game for practice, simply press the CL Key twice after the LEDs have come on to signal that the time has run out. You can then continue playing that game. For the rest of the moves you make, you will be allowed the same amount of time that you had originally set. If the time should run out again, the computer will again light the LEDs to show this.

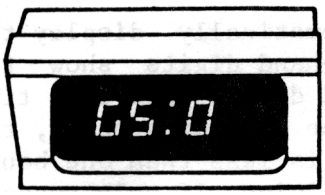
5.4 PUTTING IN MODULES / CHANGING MODULES

Your chess computer has been designed to allow you to expand and improve its programs by using interchangeable modules. General and special modules for all phases of the game will be available.

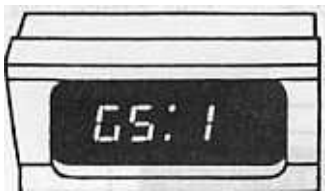
During a game, the computer will signal to you when you should change modules and which module to put in. The computer will even tell you the type of problem you have set up after you have entered the pieces on the board (middlegame, endgame).

By means of the following display indications, the computer tells you the type of position you are dealing with (GS = Game Stage). At the same time, it will suggest when you should put the module in.

When putting in or changing modules, it is imperative that you follow the instructions that come with each module. Installing the module incorrectly can cause the computer to malfunction or can cause the game that has been played so far to be lost.



Opening



Middlegame

Endgame

Before putting a module in, please note the following:

a. All positions that are entered must be checked for legality.

b. Before the module is put in, the current move must be completed and any illegal move indication must be cleared.

c. If you are choosing options or using the control keys, these procedures must also be completed before installing the module.

If you do not have a module or you do not want to use one, simply ignore the GS displays. The computer will then go back to its built-in program to continue the game.

5.5 THE START OF A GAME / FIRST MOVE

The computer automatically assumes that white will make the first move. If you are playing white, the game starts with the first move you make. However, if you want to play black, press the RV Key and the computer will start the game with a move for white. The chess clock starts up when the first move is made.

Playing with an Opening Module

Choose your opening module and push it into the module receptacle **before** you start up the game. More information about putting in and changing modules is provided in Section 2.2.

Even if you do not use an opening module, you will notice that the computer seems to move very quickly at the beginning of a game. The reason the computer responds so fast is that it contains a library of 6,167 opening positions from grandmaster play. If you make a move which is contained in this library, the program will determine if a countermove is available. If it finds one, the countermove will be made immediately and the thinking time will thus be zero. If it cannot find a countermove, the computer will start to think of a move.

You can, of course, play through a random opening variation and then choose a color and continue the game. To do this, press the RV Key for each side in turn and make the indicated moves on the board.

To play a specific opening variation, do the following: Keep pressing the RV Key until the board indicates the desired move, and then make that move on the board. You can repeat this procedure for each side until you have reached the board position you want. Then choose your color and continue the game.

Playing without an Opening Book Library

If the program has no opening library from which to draw its moves, it will be forced to take time to think about each move.

If you have an opening module in the game and you would rather not use it, it is not necessary to remove the module to accomplish this. By entering GAME CONTROL D4 CL, you can prevent the computer from making use of the opening library.

Entering Your Own Openings

If you have no opening module, or if you want to continue with an opening variation that is not contained in the library, you can use the Monitor Mode to enter any series of desired moves.

By entering GAME CONTROL E6 CL (the LED on square E6 will be on), you can enter the Monitor Mode (see Section 9.0). You can now alternately enter as many legal moves for both sides as you wish, until you reach the desired position. Before you go on to finish the game, you must now enter GAME CONTROL E6 CL again (the E6 LED will go out) to get out of Monitor Mode.

5.6 THINKING ON THE OPPONENT'S TIME

A special feature of this program is the "brain" which enables it to think on its opponent's time.

While the computer is making its move, you are able to use that time to analyze the position and think of a countermove to the move the computer might make. Similarly, the computer also thinks ahead while you are deciding which move to make. The computer does this automatically, whenever you are thinking about your move. There are no time limits on this for any level.

The "brain" is based on the following principle: While it is thinking about a move, the program will store in memory the anticipated best line of play, up to 9 half-moves (see Section 5.12).

The first move is the computer's countermove to the move you have made.

The next move is the anticipated countermove that you might possibly make. This move serves two functions. It makes up the move suggestion (see Section 5.7) which you can request. It is also the move upon which the computer will now base its calculations. Thus, the computer assumes that you will make this move and immediately starts thinking of the countermove.

If you play this move or take it as a move suggestion, the computer will play its countermove immediately or after a very short time. In this

manner, the computer is able to save up thinking time, which can then be divided among the rest of the moves. Another option would be that the computer could use the normal amount of time and thereby be able to search deeper and search more variations, thus making it stronger.

If, however, you play a different move, the computer will discontinue its first move calculation and start a new one, based on the move you actually made.

The "brain" is not used if the program has not had the chance to think about a move, e.g., right after using Problem Mode or right after getting out of book.

Turning the "Brain" Off

Before starting a game, you can enter GAME CONTROL E8 CL to invoke this special feature. After doing this, the computer no longer has the ability to think on your time. It will only start its move evaluation after you have made your move on the board.

Each playing level can be weakened by using option E8 to turn the "brain" off. You are thus given the option of having more playing levels to choose from. The computer's "brain" can be turned on or off during a game as often as desired.

5.7 MOVE SUGGESTIONS

If you are in a position where you are not sure which move to make, the computer will help you. When you press the DM Key, the computer will suggest a move for you to make by lighting the LEDs in the FROM and TO squares of that move.

The computer will not give you a move suggestion if it is not using its book opening library and has not had the chance to calculate the previous move.

A move suggestion can be taken from the book opening library, or it can be the result of the previous move's calculation, with the suggested move being the best countermove that the computer came up with (see Section 5.6).

Accepting the Suggested Move

You can accept the computer's move suggestion by simply making the indicated move on the board.

Declining the Suggested Move

If you would rather not make the computer's suggested move, simply press the CL Key to turn the LEDs off. Another option would be to simply ignore the LEDs which are on for that move and make any other move of your choice. As soon as you make your desired move on the board, the LEDs will go out.

When the DM Key is pressed, the computer will also show the current move number in the display (see Section 5.17).

5.8 MOVE TAKE-BACK

A move made by mistake or a "weak" move can be taken back by means of the TB Key. A longer series of moves, the entire game if you wish, can be taken back by repeatedly pressing the TB Key. If you have entered the Problem Mode at a previous point in the game, the take-back will only go back to that point.

The move to be taken back will be indicated by steadily lit LEDs. After pressing the TB Key, the LED on the last square which was moved TO will light. When you pick up the indicated piece, the LED will light to show you where that piece moved FROM. Putting the piece back down on that square will turn the LEDs off.

Normal moves are taken back by simply putting the piece back to its original square.

With **captures**, you must first put the capturing piece back on the board, and then put back the captured piece. The appropriate piece symbol key will indicate the color and type of the captured piece, and an LED will be on to show you the square that it occupied.

When taking back a **castling maneuver**, the LEDs for the King's move will light first. It is imperative, however, that you **move the Rook back first**, and then move the King back.

For **en passant moves**, first the capturing pawn's move is taken back and then the captured pawn is put back on the board.

A **pawn promotion** is taken back by first taking the promoted piece off the board, and then putting the original pawn back on its FROM square.

You can also take back a full move (two half-moves) at one time by pressing the TB Key twice. The computer will light the LEDs to guide you through the move take-back.

Forcing the Computer to Make a Specific Move

If you take back one of the computer's moves, the computer will not start thinking again until you have pressed the RV Key. However, you also have the option of making the next move for the computer's side. If you do this, the computer will not start thinking about its next move until after you have made your own move on the board.

5.9 CHANGING SIDES

You can change sides with the computer as often as you wish at any time during a game. Please note, however, that the thinking time which has been taken so far is not affected by the changing of sides. When you change sides, each player keeps his original time, and thus still has the same amount of time left to make his moves. If you want to change sides with the computer after it has just made a move, press the RV Key.

If you have just made the computer's move on the board, and then you decide you do not want to accept that move and you would rather change sides, press TB to take the computer's move back as described in Section 5.8. Then make a different move for the side the computer was playing and press RV to change sides with the computer.

HALTING THE COMPUTER'S THOUGHT PROCESS

You can halt the computer's thinking process at any time by pressing RV. The computer will then play the best move that it has calculated up to that point.

Press the RV Key only one time; if you should press it again, the computer will start thinking about another move (see Section 5.16, Alternate Moves).

Pressing RV will only work in this case if the computer has had the chance to calculate a move. Thus, pressing RV right away after using Problem Mode will not work. This is especially true for the special programs in Levels B5 and B6.

LOOKING INTO THE COMPUTER'S THOUGHT PROCESS

By pressing the DM Key while the computer is thinking, you can see the move that the computer is currently thinking of making. LEDs will flash on the board to show you the best move that the computer has considered up to that point.

Pressing CL will turn the LEDs off.

When the DM Key is pressed, the computer will also show the current move number in the display (see Section 5.17). Pressing the TM Key will restore the time display.

5.12 LOOKING AT THE ANTICIPATED LINE OF PLAY

While the computer is thinking about a move, it calculates and stores in memory the best anticipated line of play, up to a depth of 9 half-moves.

The first of these moves is the computer's countermove, and the second can be seen as the move suggestion (see Section 5.7). The program will allow a deeper look into its calculations, in that it will show you this principal variation on demand.

By repeatedly pressing the DM Key, the computer will show you the move it thinks you will play and the anticipated line of play up to 7 half-moves. The actual number of moves shown will depend on the amount of time the computer had to think, and does not have to agree with the displayed search depth.

Once all of the moves have been shown on the board, the first move (the computer's actual move) will be shown again. You can interrupt this process by pressing CL, at which point the first computer move will be shown.

5.13 SCORE DISPLAY

After entering GAME CONTROL E3 CL, you will be able to get another look at the computer's thought process. If you also press the LV Key while the computer is thinking, you will see the score display, the search depth (see Section 5.14) and the move time (see Section 3.4) displayed in 4-second intervals.

At the beginning of a game, or before you make your next move, enter GAME CONTROL E1 E3 CL, and the information noted above will automatically be displayed after you make each of your moves on the board.

The score is displayed in hexadecimal notation. Please use the table which follows for conversion purposes.

The value displayed shows the difference between the score displays for white and black. The score display consists of the **material score** (left-hand side of display) and the **positional score** (right-hand side of display). When the human has the advantage, a dot will appear in the middle of the display. This dot will not be displayed if the computer has the advantage.

Summary of Scoring (decimal values are in parentheses)

Material Score:

Pawn	100 (256)
Knight	300 (768)
Bishop	300 (768)
Rook	500 (1280)
Queen	900 (2304)

Positional Score:

maximum total score	FF (255)

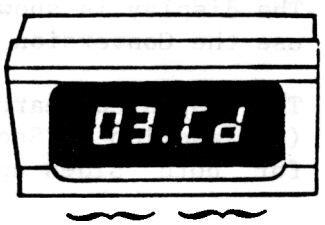
Game Scores:

Stalemate/Draw/Even	0000 (0000)
Checkmate more than	7FF1 (32753)

You can also request a display of the score after the computer has already announced its move by simply pressing the TM Key twice before making the computer's move on the board.

Example 1:
The computer announces mate against its opponent. If the computer recognizes a mate against itself, a dot will appear in the center of this display.

Example 2:
The display shown on the right indicates a definite positional advantage for the human. Please note that this display can be interpreted in various ways. Possibility A: The human has a material advantage of 3 pawns and a clear positional advantage. Possibility B: The human has a material advantage of 4 pawns, but is not as well off positionally.



Material Score **Positional Score**

CONVERSION TABLE

Places to the Left of the Decimal Point							
4		3		2		1	
hex	dec	hex	dec	hex	dec	hex	dec
0	0	0	0	0	0	0	0
1	4096	1	256	1	16	1	1
2	8192	2	512	2	32	2	2
3	12288	3	768	3	48	3	3
4	16384	4	1024	4	64	4	4
5	20480	5	1280	5	80	5	5
6	24576	6	1536	6	96	6	6
7	28672	7	1792	7	112	7	7
8	32768	8	2048	8	128	8	8
9	36864	9	2304	9	144	9	9
A	40960	A	2560	A	160	A	10
B	45056	B	2816	B	176	B	11
C	49152	C	3072	C	192	C	12
D	53248	D	3328	D	208	D	13
E	54344	E	3584	e	224	E	14
F	61440	F	3840	F	240	F	15

Examples:

hex to dec

7FFA = ?

7000 = 28672
F00 = + 3840
F0 = + 240
A = + 10
7FFA = 32762

dec to hex

7802 = ?
- 4096 = 1000
= 3704
- 3584 = E00
= 122
- 112 = 70
= 10 = A
7802 = 1E7A

NOTE:

Since the hexadecimal numbering system is best suited for the programming of microprocessors, this system is used to represent binary numbers.

Sixteen different digit symbols are used in this system. Since we only recognize 10 of the digits, the letters A, B, C, D, E and F are added as symbols.

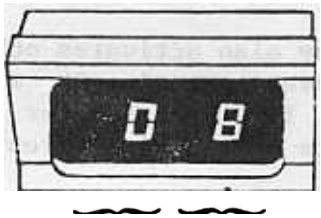
The above table will help you to decode the displayed values for the score and the search depth.

5.14 SEARCH DEPTH

If you press the LV Key while the computer is thinking, the display will show you the current **search depth** and the number of searched **variations.** The display is shown in hexadecimal format. To convert the numbers, please use the Conversion Table in Section 5.13.

The displayed search depth was arrived at by means of the Shannon-A Strategy (explanation in Section 7.0). This strategy calculates all possible moves for both sides up to a set depth. From all of these possible moves, a certain number of moves are searched further. The search depth for these certain moves, the Shannon-B Strategy, is not displayed. It can be up to 10 or more half-moves.

The number of searched move variations appears in the left-hand side of the display.



Variation Depth

Example:
The display shows that the program is at a search depth of 8 half-moves, and is now analyzing the first move. When it has finished analyzing this move, a 1 will be displayed--the program is now analyzing the second move variation. Once all moves have been analyzed, the program will start searching the next half-move up (in this case, 9).

If you enter GAME CONTROL E1 CL, the search depth will automatically be displayed whenever the computer is thinking.

By entering GAME CONTROL E1 E3 CL, the display will automatically show the search depth, the score, (see Section 5.13), and the move time (see Section 3.4) in 4-second intervals.

You can also request a display of the search depth after the computer has already announced its move by simply pressing the TM Key before making the computer's move on the board.

BEST MOVES / RANDOM MOVES

The program will usually make the best move it can (the highest scoring move it found in the time it had to analyze the position).

If it finds two or more moves that have basically the same value, it will pick one of the moves randomly.

Along with the best move found, you can ask to see the alternate moves (see Section 5.16).

ALTERNATE MOVES

When the computer has finished its search and has come back with a move, you can push the RV Key to have it make a different move. If you choose to do this, you cannot, of course, have moved the computer's piece on the board.

You can repeat this procedure as often as you wish. All possible moves will be shown, in the order of their score. The set time limit is used for each of these moves.

Each move is only shown on the board one time. When the last move is repeated, there are no more possible moves.

You can end this procedure at any point by simply making a move on the board.

5.17 MOVE COUNTER

To activate the move counter, simply press the DM Key. The display will show the current move number for the side to move.

Along with the move number display, pressing the DM Key also activates other functions at the same time. If it is your turn to move, pressing DM will suggest a move for you to make (see Section 5.7). If the computer is thinking about its move, pressing DM will show you the move it is currently considering (see Section 5.11).

Example:
The side which is moving has made 62 moves, and is currently thinking about the 63rd move. The numbers in the display are shown in hexadecimal form.

5.18 ENDING THE GAME

The chess game ends with a mate, a resignation, a stalemate, or a forced or agreed-upon draw. The computer uses different combinations of steadily lit or flashing LEDs to display, announce, or claim all of these game endings.

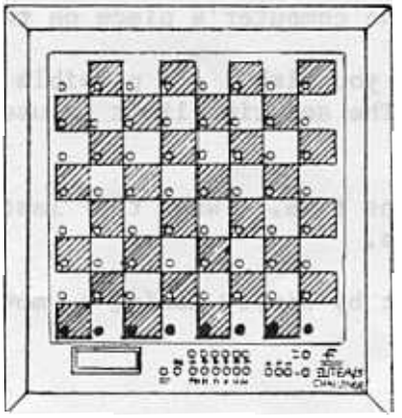
5.18. CHECKMATE / RESIGNATION

If the computer discovers a forced mate against you, it will announce how many moves it will take to mate you. This announcement is made by lighting rows of LEDs on the board. In this case, the number of rows left unlit indicates the number of moves to mate. For example, if the computer finds that it can mate you in 7 moves, the 7 upper rows will be unlit, and only the LEDs on the bottom row will be on.

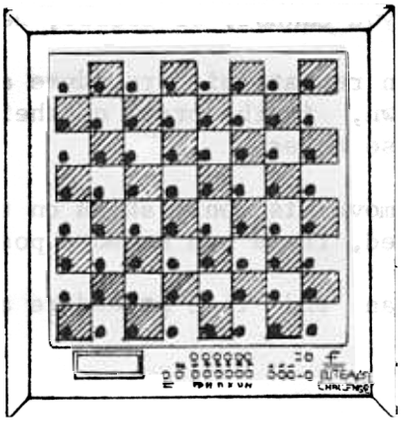
Pressing the CL Key will turn the LEDs off, and the computer will then show you its move on the board.

When the computer actually mates you, all of the board LEDs will light.

If you have entered GAME CONTROL E2 CL (Resign Enable), and the computer sees a forced mate against itself, it reacts as above, but the LEDs will be flashing. This indicates the computer's resignation.

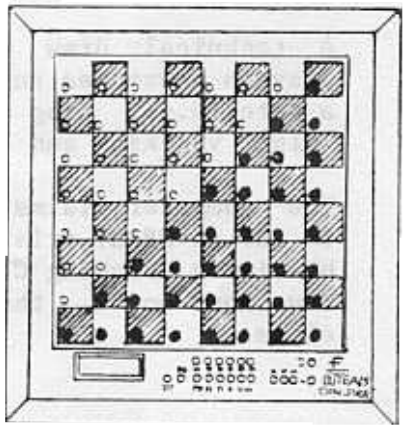


Mate Announcement
"Mate in 7"



End of the Game
"Checkmate"

5.18.2 STALEMATE



End of the Game
"Stalemate"

A game is drawn by stalemate when the player whose turn it is to move has no legal moves, and his King is not in check.

The computer claims a draw by stalemate by lighting the A1-H8-H1 triangle of LEDs on the bottom of the board.

When this occurs, the game is over and cannot be continued.

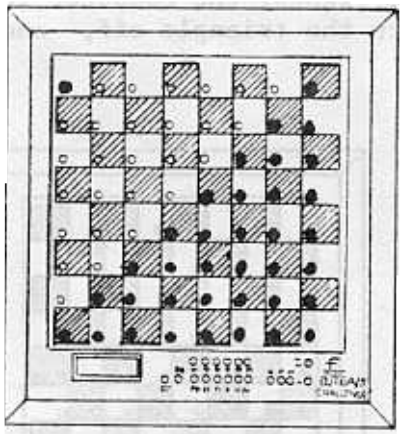
5.18.3 FORCED DRAWS

Draw by Repetition

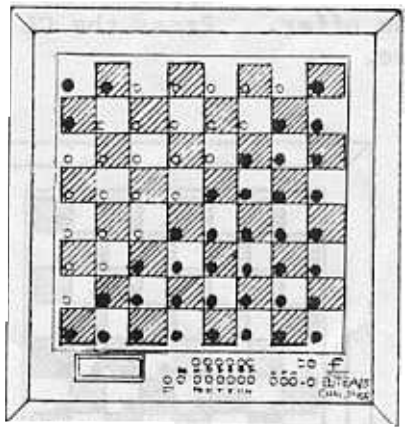
A game is drawn, at the request of one of the players, when the same position occurs three times and the same player has the move each time (for example, perpetual checks).

The position is considered to be the same when the pieces of the same type and color are on the same squares.

The computer claims this draw by lighting the LEDs in the A1-H8-H1 triangle, plus the A8 LED. Pressing CL will turn the LEDs off and the drawing move will be played.



Draw by 3-Time Repetition



Draw by the 50-Move Rule

Draw by the 50-Move Rule

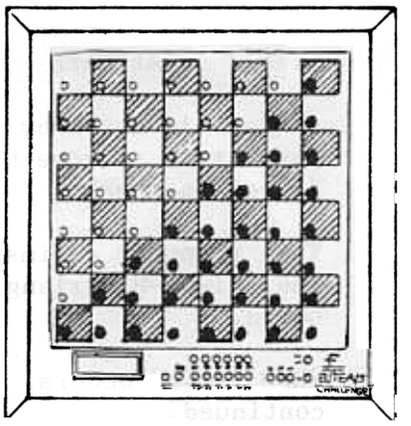
A game is drawn when the player to move can prove that at least 50 moves have been made by both sides without either sided having pushed a pawn or captured a piece.

The computer claims this draw by lighting the LEDs in the A1-H8-H1 triangle, plus the LEDs in the A8-A7-B8 triangle. Pressing CL will turn the LEDs off and the drawing move will be displayed.

Technical Draw

A technical draw occurs when neither of the two players possesses sufficient material to bring about a mate (e.g., King and Bishop vs. King or King and Knight vs. King and Bishop).

The computer claims this draw by flashing the LEDs in the A1-H8-H1 triangle. You can continue the game by simply pressing CL to turn the LEDs off. After a few more moves, the computer will repeat its draw claim.



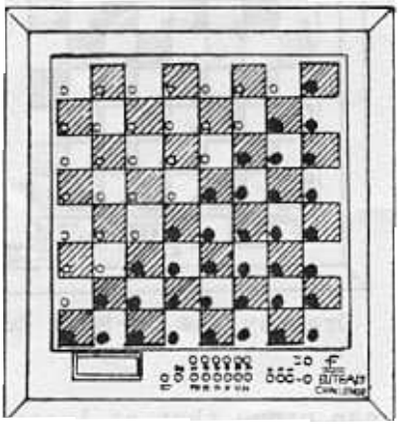
End of the Game "Draw"

5.18.4 DRAW BY AGREEMENT

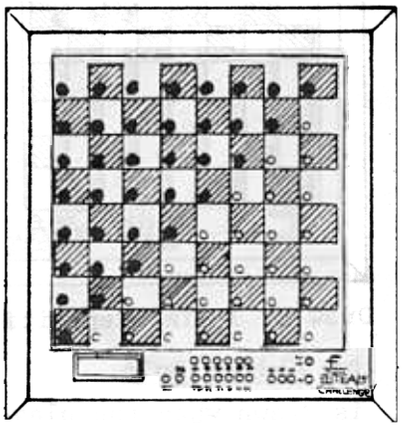
If the computer sees that no mate is possible because of a lack of material, it will offer a draw by flashing the LEDs in the A1-H8-H1 triangle. Pressing CL will turn the LEDs off and the countermove will be played. To decline the draw offer, simply keep on playing.

You can also, of course, offer the computer a draw. To do this, first take your King and the computer's King off the board. Now put the computer's King back on the board, and then put your King back. The LEDs in the lower A1-H8-H1 triangle will flash. Press the RV Key to complete your draw offer.

The computer will accept the draw offer by lighting the LEDs in the A1-H8-H1 triangle. If the upper A1-A8-H8 triangle lights, the computer is declining the draw offer. Press the CL Key to turn the triangle off, and make your next move.



"Draw Offer Accepted"



"Draw Offer Declined"

6.0 CHESS PROBLEMS

6.1 ANALYSIS LEVEL B1

Contrary to the other playing levels (A1 to A8, B2, B3, and B7), level B1 has no time limit. Due to the computer's memory capacity, the search depth had to be limited to 32 half-moves.

Get into this level by entering LV B1 CL. When RV is pressed, the computer will start thinking. The program will search for a move until it sees a mate; until it reaches a search depth of 32 half-moves; or until the RV Key is pressed to interrupt the thinking process.

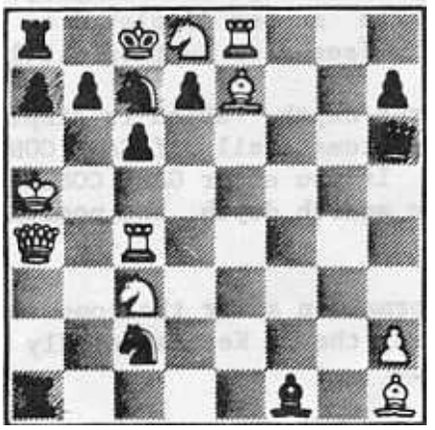
All of the features listed in Section 5.0 are also valid for this playing level

6.2 MATE SOLVING LEVEL B6

For the mate solving level B6, a special program is activated which only searches for mates.

Since positional and material values are disregarded in the move search, this program is not suitable for regular chess games. Countermoves should therefore be made by the human or obtained from the computer on another level.

A special feature of this program allows the search depth to be limited. Unnecessarily deep searches are prevented; the amount of time used will be reduced to the minimum time necessary. Another feature of this level is the ability to find **all solutions** (alternate solutions) within the set search depth.



Mate in 7 Moves

Solution: Nd8 x c6 (+)

Solution Times:
Level B1 in 3min 09sec
Level B4 (05): 3min 12sec
Level B5 (05): 4min 28sec
Level B6 (07): 2min 09sec

This program works in much the same way as the B-Strategy of the playing levels. This search is also referred to as a **non-iterative search.** For a detailed description, see Section 7.2.

The setting of the search depth usually limits the number of moves searched. Because of the characteristics of the program, however, certain moves are searched further. These moves, also called forced move sequences, are capturing moves, checks, and escapes from check situations. This enables the computer to solve many problems with the search depth set very low.

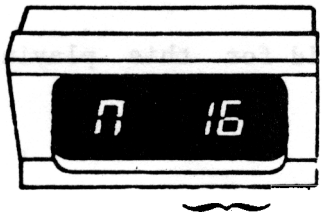
The illustrated chess problem can be solved correctly in only 2 minutes and 09 seconds, at a search depth setting of 7 moves.

Finding relative alternate solutions, however, can only be done if the set search depth is identical to the shortest possible solution.

This program also works so that, instead of "giving up" on a problem, a mate with a longer move sequence will be displayed.

6.2.1 SETTING THE SEARCH DEPTH

By entering LV B6, you can set the desired search depth for the computer. The left side of the display will show an "n" for mate in "n" moves. The right side of the display shows the number of moves to mate. The search depth can be set by repeatedly pressing the LV and TB Keys. Set the number for the one column with LV, and the number for the ten column with TB.



Search Depth

Due to the computer's memory capacity, the search had to be limited to 31 half-moves. Thus, the program has the ability to solve mate problems up to 16 moves.

It is possible to set the display for up to 99 moves. However, all settings greater than 16 will automatically be reverted to 16 by the computer.

After setting the desired search depth, end the procedure by pressing the CL Key. Pressing RV will cause the computer to start the search.

6.2.2 LOOKING INTO THE COMPUTER'S SEARCH PROCESS

While the computer is searching for a move, the search depth can be displayed by pressing the LV Key. The number on the right signifies the set search depth in half-moves. To solve a mate in 6 moves, for example, the computer would have to search 11 half-moves. The number displayed on the left is the number of variations searched so far (see also Section 5.14).

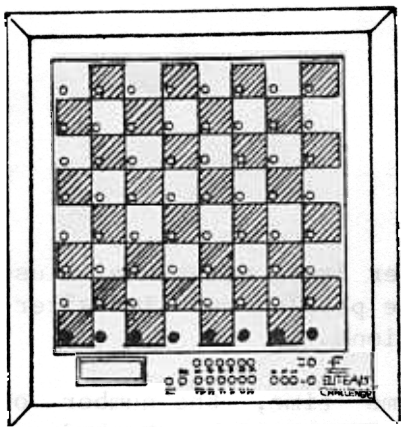
Pressing TM will show the move time. The search depth, which is displayed when the LV Key is pressed, will be displayed automatically if GAME CONTROL E1 CL is entered before the search is started. If you enter GAME CONTROL E1 E3 CL, the display will automatically show the **search depth**, the **positional score**, and the **move time** in 4-second intervals.

You can also request a display of all this information after the computer has already announced its move by simply pressing the TM Key repeatedly before making the computer's move on the board.

If you press the DM Key while the computer is thinking in order to look at the moves it is considering (see Section 5.11), the computer will start showing you a move only after it has searched the first variation.

6.2.3 THE SEARCH / ANNOUNCEMENTS

Pressing the RV Key will start the computer's search process. The program will search until it finds a mate, or until it recognizes that no mate is possible within the set search depth.



Announcement
"Mate in 7 Moves"

If the computer finds a mate, it will show a number larger than 7FF1 in the display.

A mate in less than 8 moves will also be displayed on the board by lit LEDs. The number of rows left unlit will signify the number of moves to mate (see diagram).

When the computer makes the mating move, all of the board LEDs will be on.

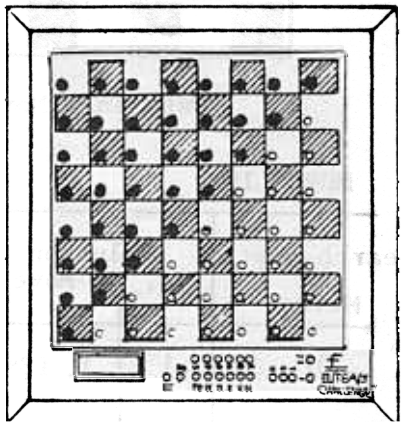
Pressing CL will turn the LEDs off, and the computer's move will be displayed on the board.

If the computer finds no solution, it will signify this by lighting the LEDs in the upper A1-A8-H8 triangle (see diagram).

This indicates that there is definitely no solution to the problem within the set search depth.

For longer mate problems, the search depth setting should be higher.

The search procedure can be halted by pressing the RV Key. This is only possible, however, after the program has finished a move calculation.



Announcement
"No Mate Possible"

Display of Moves to Mate

As noted in Section 5.12, up to 9 half-moves of the mating sequence can be displayed. Therefore, the solutions for problems up to mate-in-5 can be shown in their entirety.

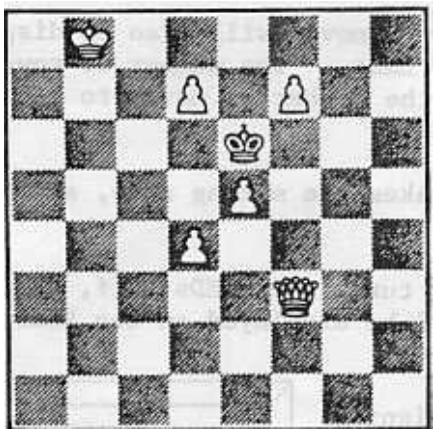
6.2.4 ALTERNATE SOLUTIONS

After a mate has been announced, you can request the computer to search for other possible solutions.

In order to do this, **do not** make the computer's displayed move on the board. Simply press the RV Key at this point, and the computer will keep on searching.

This process can be repeated after each solution is found, until either a mate with a higher move number is found, or until the computer lights the upper triangle to signify that no more solutions can be found.

Example 1



Mate in 2 Moves

Problem:

The computer is to solve the illustrated mate problem and find alternate solutions.

At the same time, the number of moves to mate should be checked.

MOVE LIST

Search Depth in Moves	Solution No.	Solution Move	Move Sequence to the Mate	Display: Mate in	Time Taken Score Search Depth	Comments
02	1	1. f8=N+	... Ke7 2. Qf6 #	2	0'00" 7FFC 1 2	Main Solution
02	2	1. f8=Q	... Kd7x 2. Qd5 #	2	0'00" 7FFC 0 3	1st Alternate Solution
02	3	1. d8=R	... Ke7 2. Qf6 #	2	0'00" 7FFC 4 3	2nd Alternate Solution
02	4	1. d8=B	... Kd7 2. Qd5 #	2	0'00" 7FFC 4 3	3rd Alternate Solution
02	~~5~~	1.f8=R	...	3		No alternate solution, since one more move would be necessary

From the above list, we can conclude the following:

The problem can be solved in 2 moves
The problem has 4 possible solutions

7.0 EXPERIMENTAL CHESS

INTRODUCTION

The problem of finding the best move in a certain board position cannot be described exactly, and therefore also cannot be solved according to an exact formula. By means of special mathematical approximations, one can repeatedly find approximate solutions, which can eventually get close to the exact solution. This type of approximation can also be used in chess programs. Such a procedure is known as **iterative search** (iteration = latin for repetition). The basis of this procedure is to use moves that have already been calculated as approximate solutions for a new calculation, based on the previous moves, and to repeat this procedure again and again with deeper and deeper search depths.

Another procedure, similar to the Shannon-B Strategy, consists of calculating all moves one after another, up to a set search depth. Since the program does not have to re-calculate moves that have already been searched in this case, this procedure is referred to an a **non-iterative** search.

Your chess computer contains these special programs in levels B4 and B5. Because of the characteristics of these playing levels, they have a limited playing strength if they are used for normal games, i.e., games with fairly short thinking times. For correspondingly high thinking times, these levels become very interesting and valuable experimental and analysis programs. Since the number of possible variations goes up steeply with the deeper searches, special sub-programs make sure that so-called "pointless" moves are not searched further and that the variations to be searched are reduced to only those actually necessary.

Another feature of the program is the fact that it searches certain moves beyond the set search depth, similar to the playing and mate solving program. These moves, also called forced move sequences, are capturing moves, checks, and escapes from check situations.

7.1 THE ITERATIVE SEARCH

In order to analyze a certain position and find the best move, the program follows certain steps.

After a position has been entered, the program first analyzes this position. As part of this analysis, the board set-up will be checked for legality and a material balance will be made. At the same time, the type of position will be determined, and the computer will decide which routines it must use in its search (e.g., sub-routines such as pawn endgames).

The search will then begin in depth 1 (= 1 half-move). The program takes all possible first moves, scores them materially and positionally, and makes a numerical move list. The move with the highest score is considered the best move, and thus heads the move list. If you should interrupt the computer's thinking process for any reason (see Section 5.10), this "best move" would be played by the computer.

Going by the move list, the computer will now begin to find the best move in the next depth, search depth 2. For this, the program will go back to the starting point to re-analyze search depth 1 and then analyze the counter-moves. Once this analysis is finished, the move list will be corrected, taking into account the new scores.

The computer then takes the new move list and again goes back to the starting point and analyzes the move and countermove once more, plus the next move made after the countermove. Once search depth 3 has been analyzed, a new move list is once again made up.

This procedure is repeated until the set search depth has been reached and analyzed. The move that heads the last move list will be the solution to the chess problem, and will thus be the move the computer will play.

The deeper the search depth is set, the stronger the move will be. The amount of time that is taken for repeating these calculations is actually less than if the program stored calculated data and called up the variations with continous computation.

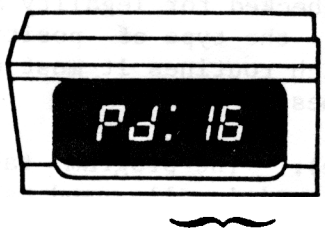
7.2 THE NON-ITERATIVE SEARCH

After doing the positional analysis described in Section 7.1, the program will make up a move list. All moves will be analyzed one by one, up to the set search depth. Once all moves and move sequences have been scored, the program will sort this information and make up a move list. The move with the highest score heads this list and will be played at the end of the search.

If you interrupt the computer while it is thinking, the computer will play the move that it analyzed and scored last. This move might or might not be the best move.

7.3 SETTING THE SEARCH DEPTH

After entering LV, activate B4 for the **iterative search**, or B5 for the **non-iterative search.** The left-hand side of the display symbolizes these special levels, and stands for the depth of half-moves (or ply-depth). The two-digit number on the right displays the set search depth in half-moves.



Search Depth in half-moves

After activating either square B4 or B5, the search depth is entered by repeatedly pressing the LV and TB Keys. TB will set the ten column, and LV sets the one column. Due to the computer's memory capacity, the search depth had to be limited to 32 half-moves.

It is possible to set the display for up to 99 moves. However, all settings greater than 32 will automatically be reverted to 32 by the computer.

After setting the search depth, end your entry by pressing the CL Key. Press RV to start the search.

7.4 LOOKING INTO THE COMPUTER'S SEARCH PROCESS

While the computer is thinking, pressing the LV Key will display the search depth. The number on the right shows the search depth in half-moves. During an iterative search, the depth in which new countermoves are being analyzed will be displayed. In a non-iterative search, the set search depth will be displayed.

The left-hand side of the display will show the number of searched variations (see Section 5.14).

Pressing TM will show the move time. The search depth is displayed when the LV Key is pressed, or will be displayed automatically if GAME CONTROL E1 CL is entered before the search is started. If you enter GAME CONTROL E1 E3 CL, the display will automatically show the **search depth**, the **positional score**, and the **move time** in 4-second intervals. You can also request a display of all this information **after** the computer has already announced its move by simply pressing the TM Key repeatedly before making the computer's move on the board.

When the DM Key is pressed, the best move found up to that point will be shown on the board (see Section 5.11). During a non-iterative search, a move will only be displayed after the computer has reached the set search depth.

8.0 STUDYING BOOK OPENINGS

Introduction

A chess game can generally be divided into three main phases: the opening, the middlegame, and the endgame. Each of these three phases has its own rules, which respectively only apply to that portion of the game.

The **opening** is the first stage of the chess game, and usually takes up the first 10 to 15 moves. There are great numbers of move possibilities, even at the beginning of a game.

After centuries of practical tests and the last 20 years of scientific research, many moves and variations have been singled out as being unsuitable, and the circle of useful moves had been substantially reduced.

The following are basic principles to follow:

1. Actively develop pieces to gain an advantage
2. Avoid incorrectable weaknesses in the pawn structure
3. Develop a safe position for the King

Different rules, not dependent on playing strategy, can be derived from these principles.

These proven move sequences from opening theory are written up in opening literature. Part of this information is stored in your game's **book opening library.** This gives the computer a higher playing strength, since it sees the right move immediately, and can use up the time it has saved as extra time to consider future moves.

The Book Practice Mode gives you a new way to study the most important main openings with the most popular variations. Beginners, hobbyists, and occasional players can now give up the tedious study of opening books. You now have an ideal way to remember the openings. It is enough to simply know the strategic goal of a specific opening variation.

The library has been supplemented by many move sequences that have not been researched as a part of opening theory or seem to be refuted by experts, but are still moves that are made time and time again by occasional players and even tournament players. Although the computer will not make these moves in a regular game of chess, the program will know how to respond to these moves.

As an example, the opening move a2-a3 is not very highly regarded in terms of value in a chess game. The computer will never "willingly" make this move in a game. However, if you should decide to open the game with this move, the computer will immediately come back with the best response.

In **Book Practice Mode,** the computer makes no distinction between these moves. The random move generator determines which move will be played.

Book Opening Modules CB9 and CB16

Two book opening modules are available for the Elite A/S. One of them (CB9) is narrow and deep, whereas the other (CB16) is broad and shallow.

Model Number CB9 contains 8,160 opening moves, all of which are unique. This opening book module has 381 lines to an average depth of 30 half-moves, so the effective number of positions is 11,430.

Model Number CB16 has 16,100 positions, all of which are unique. It contains 1,345 lines to an average depth of 20 half-moves, so the effective number of positions is 26,900.

8.1 GENERAL STUDY OF OPENINGS

For general opening practice, the computer will dictate the opening to study by making random countermoves.

Get into this mode by entering GAME CONTROL E7 CL. At the same time, choose your color (see Section 5.2) and your direction (see also Section 5.2). If you are playing white, you open with the first move. If the computer plays white, press the RV Key and it will make the first move.

After each computer move, you must try to continue the game by playing the move that you consider strategically best. If you play a move that is contained in the opening library, the computer will determine if a countermove is present. If it finds the countermove, the computer will play it immediately, using none of its thinking time. If there are several moves available as countermoves, the computer will randomly pick one of the moves.

If no move is available or if you make a move that is not in the computer's book, the computer will signal the end of the opening variation. It does this by beeping three times and making a voice announcement. It also shows the end of book by keeping the LED of the last TO square on.

If the computer plays the last move of a book opening variation, it will also signal this as described above.

You can study another variation by taking back the last move (the move for which the TO LED is still on), and then entering GAME CONTROL D6 CL. After this D6 entry, all previous options (such as control tone) will be as previously selected and do not have to be re-entered.

8.2 STUDY OF SPECIFIC OPENINGS

In addition to the general opening study, you can also practice specific opening variations of your choice. To do this, have the computer play your chosen variation up to a certain point. Variations can be specifically chosen by repeatedly pressing the RV Key.

After each press of the RV Key, all stored countermoves will be shown on the board, one by one. Press RV until you see the desired move on the board,

and then simply make that move. Follow this procedure alternately for both sides, until you want to continue the opening variation for one side.

Example: (Using CB16 module) To 1. d2-d4, the computer has 11 possible countermoves: d7-d5, d7-d6, Ng8-f6, Nb8-c6, e7-e5, e7-e6, b7-b5, b7-b6, f7-f5, c7-c5, and g7-g6. You can determine which move the computer should play by repeatedly pressing the RV Key.

TAKE-BACK OF OPENING MOVES

By repeatedly pressing the TB Key, you can take back the entire game. The LEDs will light to guide you through the take-back procedure.

First, the LED on the last square which was moved TO will light. When you pick up the indicated piece, the LED will light to show you where that piece was moved FROM. Putting the piece back down on that square will turn the LEDs off. For details on how to take back different types of moves, see Section 5.8.

When you get out of this mode, as described in Section 8.5, you cannot get back into it by using the take-back feature.

OPENING MOVE SUGGESTIONS

If you are not sure of which move to make, the computer can help you by giving you one or more move suggestions.

When the DM Key is pressed, the computer will use LEDs to indicate a suggested move on the board. By repeatedly pressing the DM Key, it will show you all stored countermoves.

For further details on move suggestions, see Section 5.7.

CONTINUATION INTO A GAME

When you want to go from the opening variation directly into a game against the computer, do the following.

If the move you make is not in the computer's opening book or if it is the last stored move of the opening variation (the computer will indicate this as described in 8.1), simply press the RV Key to make the computer start thinking about its next move and continue the game.

If it is the computer's turn and it plays the last move of the opening variation, you can continue the game by making its indicated move, pressing RV, and then making your move.

You can set the playing level after you have made the computer's move on the board. You can also, however, set the playng level before you go into Book Practice Mode.

OTHER TYPES OF GAMES

0.1 MONITOR MODE

If desired, you can turn the game on and play against another human. To do this, enter GAME CONTROL E6 CL to get into Monitor Mode.

In this mode, the computer will only check the legality of the moves. If an illegal move is made, the computer will announce this (see Section 2.5).

The computer's chess clock can also be used in Monitor Mode. For tournament games, the time display will be shown as described in Section 3.4.

For a speed chess game, set the time on level B2 (see Section 5.3.2.2). If either of the players goes beyond the time limit, the computer will claim this as described in Section 5.3.2.2.

If desired, the computer can also continue the game for either or both players. To do this, press RV at any time and the computer will think of a move for that side. You must, of course, first set a time limit by entering one of the playing levels.

All of the features listed in Section 5.0 are also valid when you are in this mode.

THE COMPUTER PLAYS ITSELF

Watch the computer play against itself. By doing this, you can study its strategy and tactics, its offense and defense, its opening and endgame. Compare the moves you would have made in certains positions with the moves the computer makes. Or study the development of the game from a specific point or from an opening variation.

The move times are actual thinking times, since the computer's "brain" (see Section 5.6) is not used here.

Set the thinking time by entering one of the playing levels. After you have chosen the level to set the time, start the game by pressing RV to have the computer make the first move. Simply press RV after each move is made, and the computer will play through the whole game.

You can go into the game and make moves of your own at any time. All features described in Section 5.0 are also valid for this type of game.

ADDITIONAL INFORMATION

POSITIONAL ANALYSIS

If, after you have entered or changed a board position, you make the computer start thinking about a move by pressing the RV Key, the program will not start calculating the move immediately.

The program will first do a positional analysis. Generally, this procedure takes less than one second, but it can also take several seconds.

In its positional analysis, the computer will check the board set-up for legality and will make a material balance, setting up a move list at the same time. It will also determine and set the type of position and determine which routines it will have to use in its search (e.g., sub-routines such as pawn endgames).

As previously described in Section 5.4, the computer will also display which module you should use.

A positional analysis is recognizable by a search depth display of 0 0 or the last value that was shown. As a positional score, first the "total score" of the computer's pieces will be displayed as a material balance (e.g., 7FFA).

Once the program has started searching for a move, the display will then show the actual values for the search depth (see Section 5.14) and the positional score (see Section 5.13).

Entries such as RV and DM have no effect while the computer is making a positional analysis.

BATTERY PROTECTED MEMORY

When the Elite A/S Challenger is switched off, its memory still retains the information and instructions which it has been given. If, for any reason, the power is switched off in the middle of a game, certain features of that game will be recorded, making possible an eventual resumption of play.

A built-in rechargeable ni-cad battery makes this feature possible. If the battery is fully charged, the computer's memory will be retained for 3 to 6 weeks. To fully charge the battery, the game must be plugged into a power outlet for 8 hours. The 8 hour charge need not be continuous and, in fact, 8 hours of playing the computer, spread over a week's time, is enough to keep the battery fully charged.

11.0 Question and Answer Section

1. WHAT DOES LEVEL B6 DO? HOW DOES IT DIFFER FROM LEVEL B1?

   Level B1 is a normal search with no time control cut-off. Thus, it performs a full-width iterative search, progressing deeper and deeper. If a mate is found, the search is terminated and the move is announced. Level B1 can solve many (though not all) mate problems.

   Level B6 requires as input the number of moves until mate. It searches only for mate, omitting a positional evaluation. It performs an iterative search, confining its search depth to the level at which the mate was said to occur. Thus, Level B6 will never find a deeper mate (as sometimes happens with Level B1).

2. WHAT SETTING IS LIKELY TO YIELD THE FASTEST SOLUTION TO A MATE PROBLEM?

   Level B1 will usually be fastest, IF it can find the mate. See Question 1.

3. IS THE COMPUTER LIKELY TO PLAY A STRONGER GAME ON THE A LEVELS THAN ON THE COMPARABLE B3 LEVELS? FOR EXAMPLE, DOES LEVEL A4 YIELD STRONGER PLAY THAN A B3 SETTING OF 30/30 OR 60/60?

   No. The two (for matched time settings) are identical. The A Levels provide a speedy way to set up some of the most common controls.

4. IN PROBLEM MODE, HOW CAN YOU SET THE SIDE THAT IS TO BE ON MOVE? THAT IS, HOW CAN YOU BE SURE THE PROBLEM WILL BE WHITE TO MOVE, OR IF NECESSARY, BLACK TO MOVE?

   Follow these steps:

   a. Set up the position using Problem Mode and terminate Problem Mode with the CL Key in the usual manner.
   b. Press the DM Key. Challenger will say "light" or "dark", thus telling you who is currently on the move.
   c. If you want the other side to be on the move, enter GAME D5 CL to activate the "Change Color to Move" feature.

   -OR- Knowing that side to move is not changed in Problem Mode, arrange to enter Problem Mode with the proper color on the move, i.e. re-order the above steps: b, c, and then a.

5. DOES THE 3-FOLD REPETITION DRAW ROUTINE ALWAYS WORK?

   Not always. There is a limit to the size of the history table which the computer checks in looking for draws. That limit is exhausted before the repetition occurs in some cases.

6. ARE BOTH ITERATIVE AND NON-ITERATIVE SEARCHES CONDUCTED FULL-WIDTH? WILL BOTH SEARCHES ALWAYS REACH THE SAME CONCLUSION, IF PERMITTED TO FINISH CALCULATING?

Yes, both searches are conducted full-width. However, they will not necessarily always reach the same conclusion, for the following reason: Suppose you are considering a search depth of 4 half-moves. The non-iterative search goes straight to the 4th half-move to begin its work. In the course of searching, it finds a move "M" with score "S". If score S is the best score yet found, move M will be a new best-move and it will be moved to the front of the move list. Now the program continues searching and finds move "m" also with score "S". Since m is no better than M, it ignores m and goes on. If no better move is found, M will be the move played.

Now suppose we give the same problem to the computer, but request an iterative search. The iterative search will search the first half-move and pick a best move, then search the second half-move pick a best move, and so on. Finally, it starts searching the fourth half-move, but the move list is not in the original order. At each iteration, when it found a new "best-move", that move was put at the front of the move list. Suppose at the second half-move, move m was considered better than move M, and in fact m was considered to be the best move. During the 4 half-move iteration, move m and move M would still get the same score S, and that score would match the score given to the moves by the non-iterative search. But now move m comes first, IT is chosen and move M is ignored.

7 WHEN USING THE DM KEY TO GET A SUGGESTED MOVE, THE COMPUTER DISPLAYS A MOVE INSTANTLY--IS IT JUST GIVING YOU THE FIRST MOVE IT THINKS OF, OR IS THIS MOVE AS "IN-DEPTH" A MOVE AS IT WOULD MAKE ITSELF?

When the computer is searching for a move to make, it has to come up with a move for itself and then find the human's best countermove to that, then its next move, etc. It searches ahead a certain number of half-moves, and then displays its move. Thus, when the human asks for the suggested move, the response is instant since the computer has used this human move in its own calculations.

8. WHEN IN BOOK PRACTICE MODE, AROUND MOVE 19, THE COMPUTER MOVED, THEN ANNOUNCED "CLEAR MOVE" BUT WOULD NOT ALLOW ITS MOVE TO BE ENTERED AND STOPPED ALL FUNCTIONS. WHAT HAPPENED?

When you are in Book Practice Mode, the computer will say "Clear Move" if you either make a move that is not in book, or if you have come to the end of the book. If you have made a move that is not in book, you can either press TB to take back the move and make another one, or you can press RV to force the computer to accept your move and continue from that position. If you have come to the end of the book, simply press RV and the computer will start thinking about its next move.

9. DOES THE OPENING BOOK BENEFIT FROM TRANSPOSITIONS? FOR EXAMPLE, THE COMPUTER LIKES TO PLAY 1. ... D5 IN RESPONSE TO 1. NF3. IF WHITE THEN CONTINUES WITH 2. D4, WILL THE COMPUTER RECOGNIZE THE TRANSPOSITION?

   Yes, the Elite A/S is able to find transpositions at all levels if the transpositions exist in its book. In the above example, the computer will recognize the transposition and immediately respond with Nf6.

10. WHY DOES THE COMPUTER SOMETIMES SEARCH THROUGH A WHOLE HALF-MOVE THAN ONCE?

    This is a normal procedure. While the computer is going through its calculations, it sometimes happens that the computer finds the need to re-search a half-move. This is referred to as reaspiration. The computer aspires when it starts to search each half-move by assuming that the score will fall within a certain range. At the end of the search of that half-move, if the computer finds that it was wrong, it reaspires by assuming no range at all, and it searches that half-move again for the proper score. This normally happens if it sees a loss of material or a gain in material at the higher search depth levels.

11. IF MY CLOCK IS RUNNING AND I PUSH EITHER THE GAME CONTROL KEY OR THE SOUND KEY TO CHANGE AN OPTION, MY CLOCK WILL PERMANENTLY STOP FOR THAT MOVE. IS THIS NORMAL?

    Yes. This occurs because the computer does not want to charge you a penalty for the time that it takes you to set up options.

12. WHAT EFFECT DOES THE INTERMEDIATE LEVEL OPTION (E8) HAVE ON THE OVERALL PLAYING STRENGTH RATING?

    The nearest estimate is that playing with the intermediate levels will drop the computer's playing strength by about 300 U.S.C.F. rating points.

13. WHEN I GO TO START A NEW GAME WITH THE OPENING BOOK CANCELLED, COMPUTER STILL PLAYS FROM BOOK. WHY?

    You are probably activating both D6 and D4 at the same time. First enter GAME CONTROL D6 (or D8) CL for a new game. Then go back and enter GAME CONTROL D4 CL to cancel the opening book.

14. WHICH TRIANGLE IS USED TO SIGNIFY ACCEPTANCE OF A DRAW OFFER WHEN COMPUTER PLAYS WHITE FROM THE TOP OF THE BOARD?

    The same as before: Upper triangle = no, lower triangle = yes.

15. WHEN I AM IN MONITOR MODE AND I PRESS THE DM KEY, WHY DOES THE COMPUTER SOMETIMES RECOMMEND MOVES FOR SQUARES WHERE THERE ARE NO PIECES?

    While in Monitor Mode, the DM Key only works while the computer is still in its opening book, or after you have used the RV Key to have the computer think about a move. Once the computer is out of book, it

has no basis for giving you a hint. Therefore, it may display meaningless information when a hint is requested.

WHILE THE COMPUTER IS WORKING ON A MATE ON LEVEL B6, DOES THE DM FEATURE WORK?

No. While the computer is looking for a mate, it rejects all non-mating moves. Therefore, there is no move available to display.

17. WHEN SELECTING LEVEL B2 FOR A 5-MINUTE BLITZ GAME, THE COMPUTER INDICATES THAT IT HAS RUN OUT OF TIME ON THE THIRD OR FOURTH MOVE. WHY?

You have failed to enter the 5-minute time limit for the computer. After activating LV B2 and setting the human time to H0:05, you must activate B2 once more and set the display to read C0:05. Now press CL and start your game.

18. WHY IS IT THAT THE COMPUTER SOMETIMES WILL NOT ACCEPT AN EN PASSANT MOVE?

The computer will always accept a legal en passant maneuver, but the pieces must be moved in the correct manner. To move a piece en passant, you must first move your pawn to the desired empty square, at which point the square of the captured piece will light up. You should then remove the captured pawn from the board, and the maneuver will be complete.

WHEN I INITIALLY TURN THE UNIT ON WITH NO PIECES ON THE BOARD, THERE ARE NON-FLASHING LIGHTS ON H7, H1, YOUR MOVE, AND THE ROOK LIGHT. IS THIS NORMAL?

Yes, this is normal and in fact, it may not always be the H7 and H1 lights that are on, but rather other lights. The computer is responding in this way because it is prompting you to put pieces on their starting squares. To turn these lights off, you must clear the pieces from the computer's memory. To do this, press the GAME CONTROL Key and activate the D7 option to clear the board memory of all pieces.

20. WHEN SELECTING LEVEL B2 FOR A 5-MINUTE BLITZ GAME, THE COMPUTER INDICATES THAT IT HAS RUN OUT OF TIME ON THE THIRD OR FOURTH MOVE. WHY?

You have failed to enter the 5-minute time limit for the computer. After activating LV B2 and setting the human time to H0:05, you must activate B2 once more and set the display to read C0:05. Now press CL and start your game.

I N D E X

(Numbers Refer to Sections)

Algebraic Notation....2.3
Alternate Moves....5.16
Alternate Solutions....6.2.4
Anticipated Line of Play....5.12
Battery Protected Memory....10.2
Best Moves....5.15
Blitz Chess....5.3.2.2
Board - Basic set-up....4.1.1
Changing Positions....4.2.3
Book Openings - Study of....8.0
Study of General Openings....8.1
Study of Specific Openings....8.2
Playing without....5.5
Book Practice Mode - General....8.0
Continuation into a Game....8.5
Captures - Moving....2.4
Taking Back....5.8
Castling - Moving....2.4
Taking Back....5.8
Changing Sides....5.9
Checkmate....5.18.1
Chess Game - Beginning....5.1 5.5
Ending....5.18
Clock....3.4 9.1
Color to Move - Changing....4.2.4
Choosing....5.2
Computer Plays Itself....9.2
Computer's "Brain"....5.6
Computer's Thought Process - Halting....5.10
Looking into....5.11 6.2.2 7.4
Control Keys - Entries....3.2.2
Summary....3.2.2
Correcting Moves....2.5
Display....3.1.1
Draws - by Agreement....5.18.4
by Repetition....5.18.3
by the 50-move rule....5.18.3
Stalemate....5.18.2
Technical Draw....5.18.3
En Passant - Moving....2.4
Taking Back....5.8
Experimental Chess....7.0
Figurine Algebraic Notation....2.3
Forcing the Computer to Play a Specific Move....5.8
Functions of the Squares....3.2.1
Halting the Computer....5.10
Hexadecimal Conversion Table....5.13
Hint....5.7 8.4

I N D E X

(Numbers Refer to Sections)

Illegal Moves....2.5
Iterative Search....7.1 7.3
LEDs....3.1.2
Mate Announcements....5.18.1 6.2.3
Mate Solving Level....6.2
Modules - Changing....5.4
Inserting....2.2 5.4
Playing with....5.5
Opening Modules CB9 and CB16....8.0
Monitor Mode....5.5 9.1
Move Counter....5.17
Move Suggestions....5.7 8.4
Non-Iterative Search....7.2 7.3
Opening Book Line Selection....8.2
Options - Summary....3.2.1
Pawn Promotion - Moving....2.4
Taking Back....5.8
Pieces - Adding....4.2.2
Basic Set-Up....4.1.1
Changing Colors....4.2.4
Changing Positions....4.2.3
Changing Types....4.2.5
Choosing Colors....5.2
Entry Options....4.1.2
Moving....2.4
Removing....4.2.1
Playing Direction - Setting....5.2
Playing Levels - Intermediate Levels....5.3.1.1
Levels A1-A8....5.3 5.3.1.1
Level B1....6.1
Level B2....5.3 5.3.2.2
Level B3....5.3 5.3.2.1
Level B4....7.1 7.3
Level B5....7.2 7.3
Level B6....6.2
Level B7....5.3 5.3.1.2
Summary....5.3
Tournament Levels....5.3.2
Training Levels....5.3.1
Playing Squares - Entries....3.2.1
Summary....3.2.1
Position Verification....4.3
Positional Analysis....10.1
Principal Variation....5.12
Printer - Connecting and Using....2.3
Problem Mode....4.1 4.2
Random Moves....5.15
Recompute Next Best Move....5.16
Resignation....5.18.1

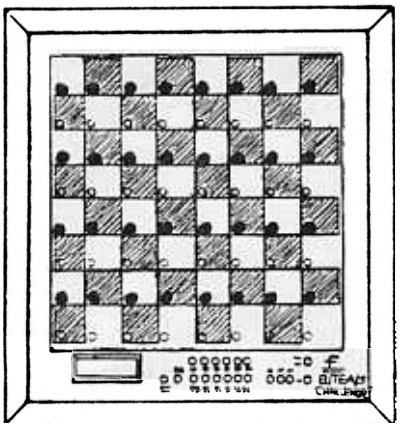
I N D E X

(Numbers Refer to Sections)

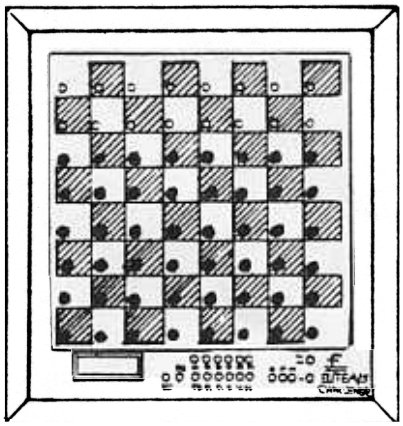
Score Display.....5.13
Search Depth.....5.14 6.2.1 7.3
Side to Move - Changing.....4.2.4
Choosing.....5.2
Speed Chess.....5.3.2.2
Stalemate.....5.18.2
Start-up procedure.....2.1
Stopping the Clocks.....3.4
Stopping the Computer.....5.10
Suggested Move.....5.7 8.4
Take-Back of Moves.....5.8 8.3
Thinking on the Opponent's Time.....5.6
Time Controls.....5.3.2.1
Time Limits - Exceeding.....5.3.2.1 5.3.2.2
Tone.....3.2.1 3.3
Transformer.....2.1
Voice.....3.2.1 3.3

Reference Sheet

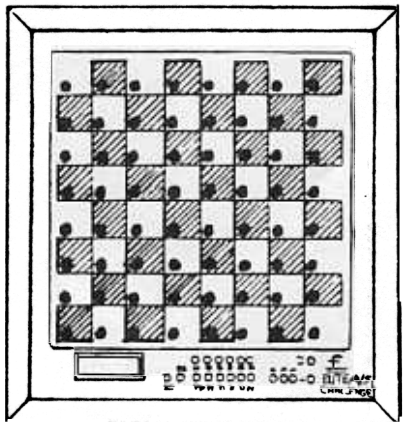
BOARD DISPLAYS



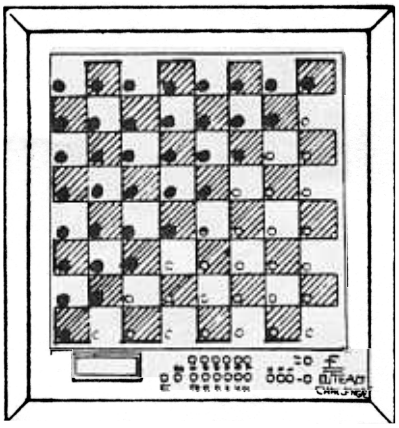
Time limit has been exceeded



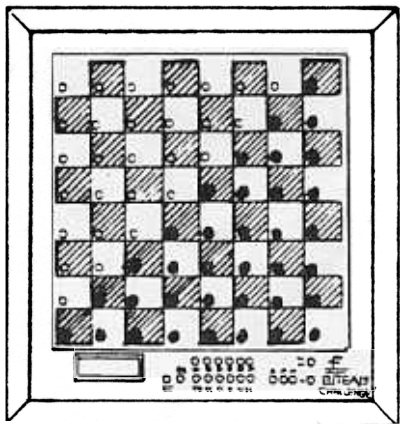
Mate Announcement
"Mate in 2"



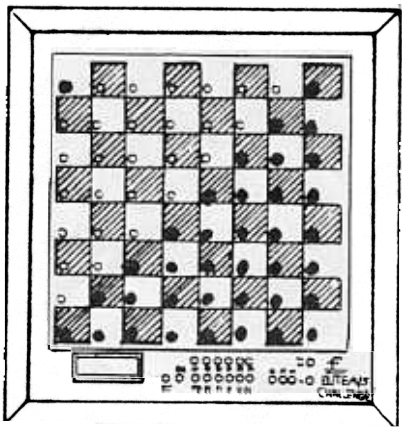
End of the Game
"Checkmate"



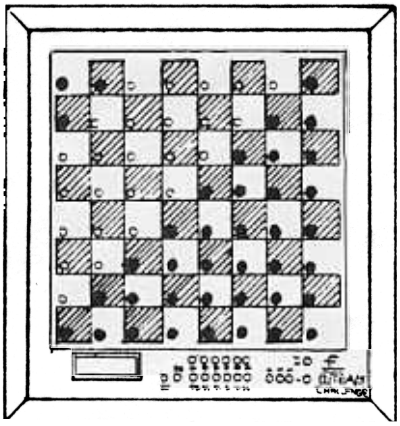
Announcement
"No Mate Possible"



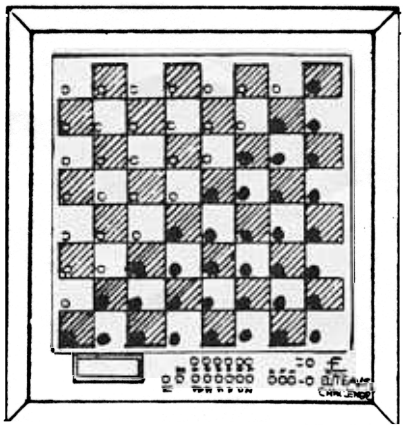
End of the Game
"Stalemate"



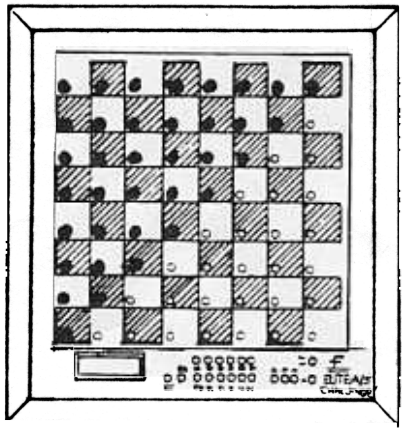
Draw by 3-Time Repetition



Draw by the 50-Move Rule



"Draw Offer Accepted"



"Draw Offer Declined"

SUMMARY - FUNCTIONS OF THE SQUARES

PLAYING LEVELS
SPECIAL LEVELS

Begin Entry: LV
Display: -LC-
End Entry: CL

BASIC OPTIONS
ADDITIONAL OPTIONS

Begin Entry: GAME CONTROL
Display: -GC-
End Entry: CL

COMPUTER VOICE

Begin Entry:
Display: -SC-
End Entry: CL

Level A8 Average Response 6 min. A8 5.3.1	B8	C8	START Memory Erased New Game 2.1 D8 5.1	Inter-mediate Level E8 5.6	F8	Computer Voice On G8	Computer Voice Off H8
Level A7 Average Response 3 m/45 s A7 5.3.1	Level B7 Fixed Time for each Move B7 5.3.1	C7	Clear Board D7 4.1	Book Practice Mode E7 8.0	F7	Computer Voice Unlimited G7	Computer Voice Limited H7
Level A6 Average Response 3 min. A6 5.3.1	Mate Solving Level B6 6.2	C6	New Game with Previous Options D6 5.1	Monitor Mode E6 9.0	F6	Computer Voice High G6	Computer Voice Low H6
Level A5 Average Response 2 min. A5 5.3.1	Non-Iterative Search B5 7.2	C5	Change Color With Move 4.1.2 D5 5.5	Figurine Algebraic E5 2.3	F5	G5	H5
Level A4 Average Response 1 min. A4 5.3.1	Iterative Search B4 7.1	C4	Cancel Opening Book D4 5.5	Disable Notation Reversal E4 2.3	F4	Control Tone On G4	Control Tone Off H4
Level A3 Average Response 30 sec. A3 5.3.1	Tournament Chess Level B3 5.3.2	C3	Print Entire Game Score D3 2.3	Display of Depth, Score, Move Times E3 5.13	F3	Control Tone Unlimited G3	Control Tone Limited H3
Level A2 Average Response 15 sec. A2 5.3.1	Blitz/ Lightning Chess Level B2 5.3.2	C2	D2	Resign Enable E2 5.18	F2	G2	H2
Level A1 Average Response 5 sec. A1 5.3.1	Analysis Level B1 6.1	C1	Changing the Playing Direction D1 5.2	Automatic Search Depth Display E1 5.14	F1	G1	H1